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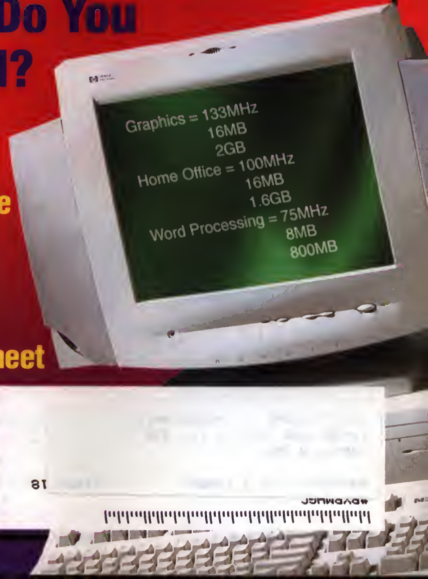

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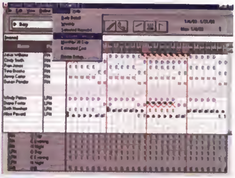

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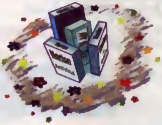

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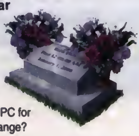

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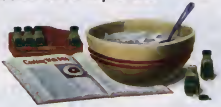

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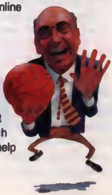

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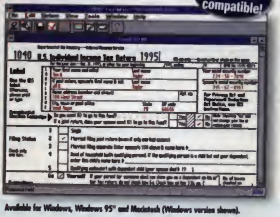

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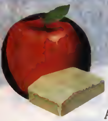
TECHNOLOGY NEWS

Compiled by Cindy Krushensky

Computers In Class



A recent study by Field Research Corp., a San Francisco market research organization, confirmed two facts most Americans are probably well aware of: Computers can be powerful tools in the classroom, but schools need more of them.

According to the 1995 Tenth Planet Teachers & Technology Survey, about 94% of the 1,000 kindergarten through sixth grade school teachers surveyed said they had found that computers are powerful motivators for improving learning. And most are using the computers they do have. About 81% of the teachers used computers at school, and 66% used computers for direct instruction, primarily for English and math.

The problem is that there aren't enough computers in the classrooms. While 76% of the classrooms had at least one computer, just 36% had two or more computers. In addition, schools seemed to shy away from using the Internet. Just 8% of those surveyed had access to the Internet from school computers. ●

Rewiring The Office

The Internet still may be the king of connectivity, but it's spawned another phenomenon that's maturing fast. **Intranets,** smaller versions of the Internet, let companies collaboratively compute using a graphical service on the Internet's World Wide Web, which lets users jump from one document to related documents anywhere on the Internet.

Instead of using special networking software, private company Intranets use Web browser software that lets employees share files and information on the Web, protected from outside access through a **firewall** (a boundary that limits outside traffic from crossing over or attacking the company network).

The number of company Intranets is growing rapidly. According to officials at the market research firm IDC, a majority of the 11.4 million business PCs currently with Web browser software are used for Intranet-only access to information, and the trend will continue.

The Intranet may mean reduced profits for networking software such as *Lotus Notes*, which was recently purchased by IBM. Intranets are currently less expensive and easier to manage; Notes costs about $275, while Web browsers can run up to $50. ●

"Chrping" Isn't Just For Birds

Imagine a computer with a split personality disorder, and you'll get an idea of what's coming in the PowerPC market.

Apple, IBM, and Motorola have been hard at work developing a computer platform for their PowerPC microprocessor that would support multiple operating systems—a move beyond the Apple operating system it now supports. Called CHRP, or the Common Hardware Reference Platform, this new platform would let PowerPC chips support the Macintosh operating system (System 7.5 and the new Copland), Windows NT, OS/2, Sun Microsystem's Solaris, and Novell's NetWare.

Apple's clone companies, such as Power Computing, have been quick to work on CHRP systems, and companies such as IBM and Motorola could get involved. Systems may appear on the market from Apple and other partners as early as mid-1996.

But will the benefits of the new chip be able to throw Intel off the top of the microprocessor mountain? While it may be hard to wrench the market from Intel chips and the Windows 3.1/95 grasp, CHRP partners have played up the fact that Intel's x86 chips may have a problem taking processors one step further to 64-bit power while still being compatible with software that works on older versions. (Current Pentium processors operate at 32 bits.) ●

The Future Of The Superhighway

While most of us are still trying to find our way through the Internet, progress on the Information Superhighway has lapped us once again. Computer scientists and networking engineers are developing an experimental high-speed network that links 30 supercomputers across the nation.

Called the I-WAY, this powerful network is a tangible piece of the ill-defined, international Information Superhighway. The U. S. Department of Energy's Argonne National Laboratory, which is operated by the University of Illinois at Chicago, put the network together as a test, linking the country's fastest supercomputers to perform scientific research.

The I-WAY uses a new **Asynchronous Transfer Mode (ATM)** network that transfers video, images, audio, and data hundreds of times faster than regular phone lines can. This comes in handy when working with the extremely fast and powerful supercomputers the network links. The I-WAY also is using a common language that keeps the supercomputers and other advanced machines compatible, even if they speak different languages. Special **I-POP**, or installed point-of-presence, computers serve as the supercomputers' gateways to the network, as they are configured the same and possess a standard operating environment that overcomes the differences in supercomputers.

Before you get geared up to access a few supercomputers, remember that the I-WAY is still in the testing phase. The I-WAY was only demonstrated at the Supercomputing '95 conference in San Diego late last year. Currently, it's being used to pinpoint and correct any problems before a national or international Information Superhighway is built. ●

PCs As Pain Relievers

An advance in magnetic resonance imaging may bring some relief to arthritis sufferers. Although MRIs, ordinarily used as a noninvasive diagnostic technique to produce computerized images of internal body tissues, can't relieve pain, they can help monitor the disease's progress and show how well arthritic joints are responding to treatment.

At the University of California in San Francisco (USCF), assistant professor Charles G. Peterfy and his colleagues use a specialized contrast agent in an MRI to study the synovial lining, the thin tissue found in the joints, of laboratory animals. This lets doctors "take pictures" to see how far the disease has progressed in the soft tissues instead of simply in the bone structure as is visible in X-rays. The process also lets them see the effect of anti-arthritic drugs.

The work, however, has a way to go before it makes it into the mainstream medical world. The method has not yet been tested on humans, and the findings were presented only recently. ●

We'll Leave The Voice Mail On

Someone needs to contact you while you are out of the office on business. What do they do—call your office and leave a message? Eventually you may be able to plant your voice mailbox at your hotel while traveling.

Late last year, AT&T introduced a voice messaging service for the hotel industry. At hotels subscribing to the AT&T Intuity Lodging voice messaging service, guests will be able to sign up for voice mailboxes that are activated on check-in and deactivated on check-out.

The voice mailbox will have many of the comforts of boxes at home. For instance, guests can retrieve messages by dialing a number, entering a password, and following voice instructions. They will be notified of messages by lights on the phone or special tones. A new feature also included on the service is a Do Not Disturb greeting that will automatically transfer calls to the voice mailbox while a guest is sleeping or out on business. The systems may appear in hotels sometime in early 1996. ●

Conflict On The 'Net

Controversy over freedom of speech via the Internet caused 1995 to go out with a bang in the online community. Just before year's end, the online service CompuServe suspended access to more than 200 Internet **newsgroups** in response to a mandate from a prosecutor's office in Germany. The specific newsgroups, German officials claimed, violated German obscenity laws because child pornography was allegedly exchanged over the network. (Newsgroups use a system called Usenet and are similar to worldwide Internet bulletin board discussion groups on which users can post messages on all kinds of topics.)

However, the online service could not just block access in Germany; it had to block access to all 4 million of its customers, worldwide. Another option would have been to pull CompuServe business out of Germany altogether, which is a serious move when you consider CompuServe has 500,000 subscribers in Western Europe.

Many Internet users and civil liberty activists were, to say the least, unhappy with CompuServe's decision. The concern is that acceptable standards in one country will be forced on others worldwide when it comes to the Internet and obscenity, not to mention what it may do to freedom of speech. But the move comes as the U.S. Congress is pushing to regulate access. An Internet indecency bill was being debated in the House and Senate at the time, making it illegal for persons in the United States to create the materials, though not necessarily punishing the online providers.

CompuServe's opinion, explained in a recent release, was that the issues under investigation should remain focused on the individuals placing the questionable content on the Internet, not companies such as the online services that provide access. The access providers, CompuServe says, have no control over the content. Daphne Kent, spokesperson for CompuServe, says the move is temporary while the company works out a way to make this kind of blocking more geographically specific. It should be noted that though the 200 newsgroups are unavailable through CompuServe, they are still available through the Internet; users who want access simply will have to find an alternate Internet provider to get to them. ●

Tech Shorts

Security First Network Bank opened its doors Oct. 18, 1995—if you can really call it that. First Network Bank is the first bank located solely on the Internet. The bank has no physical location. But it also has no problem getting customers. Within the first two months of business, it has had nearly 1.5 million visits and was fast approaching applications for 1,000 accounts for people in 38 states. Located at http://www.sfnb.com, the bank uses a software system called *Virtual Bank Manager* by Five Paces Inc. to secure transactions through the new cyberbank. . . .

It's possible that society is slowly changing from a bunch of couch potatoes to a bunch of digit heads. Results from a recent survey by the consultant firm Inteco Corp. of Norwalk, Conn., showed that more than 18 million people are watching less television and spending that time using their PCs. The study, which was targeted for advertisers looking for better ways to market their products, found that people most likely to spend less time at the TV and on the PC were males in the 18 to 34 age group. While PC owners are spending less time watching television, however, they haven't cut down on other leisure activities such as reading, going out, or playing video games. . . .

If you still think pagers are only for doctors, lawyers, bankers, or other busy businesspeople, try a taste of paging yourself. If you know someone with a SkyTel (a subsidiary of MTEL in Jackson, Miss.) pager, you can send a text or numeric message to them direct from SkyTel's Web site at http://www.skytel.com. There's also access to SkyTel's 2-Way paging and messaging service, which will send replies to you (the sender's) E-mail address. Just go to the SkyTel homepage, and click the Send a Page icon to bring up a box to enter your message. . . .

Before you decide to double your computer's RAM with *SoftRAM95*, an inexpensive software product, you'd better think twice. The maker of SoftRAM95, Syncronys Software of Culver City, Calif., is under investigation by the Federal Trade Commission. Allegedly, the product doesn't offer any improved memory performance in Windows 95, like the product claims. In fact, it was using a "Designed for Windows 95" logo that Microsoft said had not passed its certification tests. SoftRAM also may be of dubious value in Windows 3.1, as described in our January article "Fake RAM: Does It Fulfill Real RAM Promises?" At this writing, the company admitted to a problem, due to a "bug," and was recalling the product. Customers could get their money (about $30) back, which may add up to quite a sum, since the company claims it has sold several hundred thousand copies. ●

PRODUCT PREVIEWS

Forget The Sound Card . . .

It doesn't seem sensible to require that you have a sound card and speakers for your computer to create sound. Shouldn't you just plug in the speakers to get an earful?

Here's an innovative idea that's worth a look if you're a portable computer owner. DSP Solutions Inc. has placed a sound card into its speaker units so you never have to open your computer to install a sound card. Called the Portable Sound Plus, the unit plugs into the parallel port on the back of your computer and connects it to a speaker with a built-in microphone. Then you install some software, and you're ready for sound.

The Portable Sound Plus is extremely easy to install and comes with software for listening to audio CDs (if you have a CD-ROM drive), recording sounds, and creating kids' projects with sound. It works with Windows 3.1, can give a computer 16-bit sound capabilities, and is compatible with SoundBlaster and AdLib sound standards. Sound comes out of only one speaker, however, which doesn't give you as much "stereo" effect as with two speakers. Although you don't have to take up one of your expansion slots inside your computer for Portable Sound Plus, you do have to give up a parallel port on the back of your computer, which is a problem if you have only one parallel port and want to operate your printer.

We don't recommend the Portable Sound Plus for a desktop system in which you want to operate multimedia-rich applications because of the mono-speaker. We do, however, think the slim sound system can be a great accessory for a portable computer.

The Portable Sound Plus is available for a street price of about $159. The sound system soon will be packaged with DSP's Talk software that lets network users add spoken messages to all *Microsoft Office* and *Lotus Notes* documents, which then can be sent over a network or E-mail system. For more information, contact DSP Solutions at (800) 560-1817 or (415) 919-4000. ●

Oughtta' Be In Motion Pictures

You've probably already heard of the new digital cameras that let you take "pictures" and input them directly into your PC to view, print, or manipulate. But how about a digital "video" camera that will let you capture motion as well?

Ricoh Consumer Products Group of Sparks, Nev., recently unveiled a new RDC-1 digital camera that can do a little of everything when it comes to multimedia. The RDC-1 can record and play back still images, video images, audio, or a combination of the three.

The compact camera (measuring just 5.25 inches by .75 inches by 2.75 inches and weighing about 9 ounces) doesn't require special film. Instead, a special chip, called an LSI chip, optically creates signals to take motion scenes and still images, then transfers them to digital data.

You can record about 492 pictures, four motion videos with sound (lasting about five seconds each), or about one hour and 40 minutes of sound. All the items are stored on a 24 megabyte (MB) PC Card (formerly called PCMCIA Cards) that can fit in your wallet. Transfer the images and sound to your computer for viewing, and use special software to transform the data into popular file formats (such as .TIFF, .PCX, or .WAV) that you can watch, listen to, and edit. Or, connect the camera directly to your television, or a 2.5-inch LCD monitor from Ricoh, to view and listen right away. One interesting feature includes a Text Mode that lets you capture sharp text images, such as a business card or other document, on "digital film."

The Ricoh RDC-1 digital cameras were expected to begin appearing on the market in the spring in the United States, with a price of around $1,800. For more information, contact Ricoh's Consumer Products Group at (800) 225-1899 or (201) 625-4180. ●

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REQUIREMENTS: WINDOWS 3.1 OR WIN 95

Dr. Schueler's Health Informatics, Inc. P.O. Drawer 410129 • Melbourne, FL 32941-0129
Fax: 407-777-0323 E-mail: esellers @ iu.net

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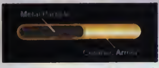
The Ceramic Coated Particle Only From Maxell.

As the oyster protects the pearl, Maxell protects something precious to you. Your data. That's why Maxell invented the ceramic coated particle. Why do you need it? Metal particles used in 4mm and 8mm cartridges are vulnerable to the ill effects of heat, humidity, and oxidation. But our **patented ceramic coated particle** stands up to these elements to protect your data. So your high capacity data storage cartridge can withstand at least 2,000 passes and maintain an archival life of up to 30 years. Now that's durability. That's Maxell.



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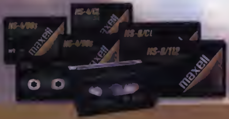
Maxell also takes 8mm recording to a new level by introducing an all new coating formulation. This means higher durability, higher output, and the lowest error rates of any manufacturer. There just is no better 8mm data recording product on the market.

Superior Customer Support

Besides protecting precious data, Maxell always takes care of its customers. That means a lifetime warranty, satisfaction guaranteed, and toll free tech support. Just call **1-800-377-5887.**



maxell

Advanced Technology, Higher Performance.

Maxell Corporation of America, 22-08 Route 208, Fair Lawn, NJ 07410.

Versatile PC Control Can Be A JOY

For those persons who have disabilities that don't let them use a mouse or trackball to operate a computer, Windows is no longer an impenetrable barrier. The ease of operating a joystick, such as those on power wheelchairs, has never existed for basic operation of a Windows computer—until now.

RJ Cooper & Associates has introduced the Switch-Adapted Mouse device-joystick (SAM-JOYstick), which gives disabled persons full access to their computers. The SAM-JOYstick operates the cursor or pointer just like a regular mouse with Windows software, including Windows 95, Windows 3.1, and Windows NT, would.

Installation of the SAM-JOYstick is simple, and the original mouse remains connected while the joystick is operational. The joystick works side by side with your mouse device, making it possible to use both devices at the same time. The SAM-JOYstick plugs into your joystick port, usually located on a sound card or game card. The installation software comes with your product and once completely installed, the SAM-JOYstick is ready to go.

RJ Cooper & Associates has switch-adapted these orthopedically appropriate joysticks so that clicking can be performed through an external switch that you will only need to single-click to make the computer believe you have double-clicked. Also, because the drag function was virtually impossible for persons with disabilities, the SAM-JOYstick contains a drag-lock button. This locks the left button down until you subsequently hit any button, and it lets users drag without having to hold any button/switch down during the drag.

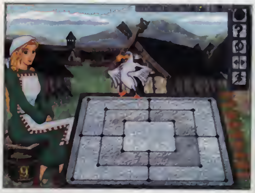
Besides the easy installation, the SAM-JOYstick is easy to use. The software lets you calibrate the joystick so that the movements are adjusted to your individual needs. The SAM-JOYstick moves the cursor at a rate equal to the extent the stick is moved so the cursor never jumps around.

The SAM-JOYstick for Windows' cost is estimated at $120 and is available only through RJ Cooper & Associates.

For More Information:

SAM-JOYstick
RJ Cooper & Associates
(800)-RJCOOPER
(714) 240-4853 ●

Strategy Hits The Board



Children learn about history and develop problem-solving strategies by playing games, such as Nine Men's Morris.

The collection of games (Nine Men's Morris, Go-Moku, and Mancala) in *Strategy Games Of The World* doesn't just teach problem-solving strategies. It also has information about the history of the games and the Viking, Japanese, and African cultures from which they come.

The games are easy to learn. In Nine Men's Morris, players take turns placing game pieces on a board that contains intersecting lines. Players can place their pieces only at the intersections, trying to make rows of three. When they make a row, they can remove one of their opponent's pieces. In Go-Moku, players place pieces on the board, which in this case is a grid, trying to make a row of five. The first player to make a row of five wins. In Mancala, the board is a series of depressions, six on either player's side and a large one, called a store, at either end. There are an equal number of stones placed in each of the small holes at the game's start; players move the stones, each attempting to end up with the most in their store.

Help is available from strategy coaches—characters who are on your side. Players also get occasional chances to listen to "real world strategies" from adults in various professions who offer examples of problem-solving techniques they have used in their careers. The strategies are ones that kids can use while playing these games and in other problem-solving situations as well.

There are 10 difficulty levels, playing against the computer or another person. The games also offer a Quickplay option, which gives the player no help but moves faster. Players can adjust details such as the size of the board in Go-Moku, the number of stones used in Mancala, or the version of the rules used in Nine Men's Morris. Though the program is geared for ages 8 to 14, the higher levels will challenge adults. With a street price of approximately $40, this CD-ROM offers entertainment and education for the whole family.

For More Information:

Strategy Games Of The World
Edmark Corp.
(800) 691-2985
(206) 556-8484 ●

Travel Abroad In Minutes

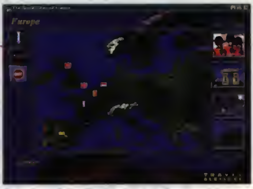
Customize a tour of top European destinations with *Travel & Leisure: Great Cities—Europe.* You can be your own travel agent and trip planner with these two interactive CD-ROMs.

This program, released in January from Creative Multimedia, features videos, slide show tours, and panoramic views of 15 Euro-pean cities including London, Paris, Amsterdam, Florence, Prague, and Rome. Three short movie clips bring these cities to life with detailed street maps, a comprehensive weather data index, and travel recommendations. Detailed multimedia presentations with commentary highlight different aspects of Europe through seven different categories: Sightseeing, Museums, Neighborhoods, Walks & Excursions, Shopping, Restaurants/Hotels, and Travel Information.

Great Cities—Europe is targeted at those planning a trip to the continent or those who just want to enjoy the sights at home. The screen depicts a map of Europe, which displays national flag icons to identify the featured cities. Once you select a city, you see a detailed street map. From there, you choose one of the specific categories. From these categories, you can opt to view the video clips or still photos.

By printing information directly from the disc, making your own travel guide is easy. You also can access travel updates and make hotel and airline reservations by going directly online from the product using such services as America Online, Prodigy, CompuServe, and Microsoft Network or by using Spry's Internet browser provided free from Creative Multimedia.

Travel & Leisure: Great Cities—Europe is available for Windows for about $29.95 and can be purchased nearly everywhere CD-ROMs are sold.



This program is an innovative way to see a panoramic view of Europe and select a specific city to tour.

For More Information:

Travel & Leisure: Great Cities—Europe
Creative Multimedia
(800) 262-7668
(503) 241-4351
Travel & Leisure
(212) 382-5829 ●

Leafing Through Disney's Animated Storybook

Users can play along with the story by clicking objects on the screen as the story is read aloud in this storybook.

Along with all the stuffed animals and action figures, children now can add animated storybooks on CD-ROM to their Disney collections.

Disney's Animated StoryBook, Pocahontas is one of Disney's most recent releases, featuring a read-along version of the movie, complete with animation and sound. Many of kids' favorite characters are there—Pocahontas, John Smith, Meeko the raccoon, Flit the humming bird, and Grandmother Willow.

Children ages 3 to 9 can choose to have the book read to them or page through on their own, clicking objects on-screen to make things happen—such as making Meeko try to catch a fish. These clickable items make children want to return and read the book over and over to find new objects that move or talk.

Several games based on the story also keep children coming back. Players can practice their aim by shooting arrows through hoops or can catch berries before Meeko gobbles them up. They also can play locate animals hiding in the forest as they learn the Algonquian name for each creature.

The program has a few features to develop reading skills. As Grandmother Willow reads the story, each word is highlighted. Clicking an ABC book also highlights more difficult words that younger readers may not understand. When children select a highlighted word, Grandmother Willow explains what it means.

We liked all the animation, music, and sound effects included in this program. It seemed less like a book on CD-ROM and more like a scaled-down version of the movie. We also liked that some of the screens expanded over to the sides—if you clicked the arrows, you could see what was happening in the periphery.

Just around the river bend is *Disney's Animated StoryBook, Toy Story*. Due out in April or May, Woody and Buzz Lightyear will take children ages 4 to 9 "to infinity and beyond." It promises to be just as amazing as the movie, as Disney has Pixar Animation Studios, the group that created the film, working on the three-dimensional animation.

It also will contain clickables and a few games. For instance, children can set off a chain of events in one screen that leads to Buzz being knocked out a window or use the cursor as a flashlight in Sid's darkroom to find other clickables and actions. Or, they can play the arcade claw game with the three-eyed Martians (set at the Pizza Planet like in the film) and a maze game that lets children guide Woody and Buzz through neighborhood streets to catch up with Andy's moving van.

Both Animated StoryBooks will be available in Windows and Macintosh versions for around $30.

For More Information:

Disney's Animated StoryBook, Pocahontas
Disney's Animated StoryBook, Toy Story
Disney Interactive
(800) 228-0988 ●

Car Shopping At Home

Consumer Reports Cars not only lets you see the car but the ratings and recommendations as well. Each car is rated using the Better To Worse scale.

How can you find just the right car that meets all of your expectations? Which models are the most reliable? How can you be as smart as your dealer to get the best price? The answers to these questions and more are available in *Consumer Reports Cars: The Essential Guide on CD-ROM.*

Consumer Reports and Creative Multimedia have put everything you ever wanted to know about cars and how to purchase them on CD-ROM. This disc includes information on new and used automobiles and information on how to maintain the automobile you own now. Just released in January, Consumer Reports Cars has all the up-to-date information available to you on one handy CD-ROM.

The program has five sections to explore: How To Buy, The Cars, Safety Information, Car Care, and Inside CR. It provides ratings, recommendations, and unbiased judgments on cars, minivans, pickups, and sport/utility vehicles. There are more than 7,300 makes, models, and body styles, both new and used, from 1987 to the 1996 model year.

Consumer Reports offers various topics with detailed information and advice for car shopping. It lists advantages and disadvantages of different car types, available options, and security devices and contains more than 30 minutes of interactive video that helps you practice negotiating with dealers, inspecting and buying a used car, and much more.

You can explore the details of specific models, from photos to test judgments to prices. Other options include a lease-and-loan calculator, suggested alternatives, a glossary, and a personal car selector that lets you combine the preferences of one or two people to find the cars that best meet the needs of one or both.

Consumer Reports also offers safe driving tips and advice on how to choose a safe car as well as tips on how to keep your car running practically forever. The program provides explanations of how a car works with animations of the electrical system, engine, transmission, and more.

It even includes a section specifically about *Consumer Reports*, which explains how cars are tested and rated by the magazines' automobile experts.

Consumer Reports Cars: The Essential Guide on CD-ROM is available for Windows with a suggested price of $19.99. The program is available at retail outlets, including book and video stores.

For More Information:

Consumer Reports Cars: The Essential Guide On CD-ROM
Creative Multimedia
(800) 262-7668
(503) 241-4351
Consumers Union
(800) 331-1369, ext. 173
(914) 378-2000 ●

Protect Your Eyes And Your Information

There is a way to reduce eyestrain at your computer and keep information private from the wandering eyes of the person next to you. With Glare/Guard's new anti-radiation privacy filters, you can have viewing privacy and reduce your radiation exposure.

The Glare/Guard Traveler 2000 notebook and Optima 1800 desktop privacy filters prevent unwanted onlookers from viewing a user's on-screen work. Designed for the rapidly growing mobile computer market, the unique privacy filter gives users peace of mind to work on sensitive information while on an airplane or in other public locations.

The new filter reduces up to 99% of magnetic radiation at a user distance of 40 inches. To protect vision, reduce eyestrain and headaches, and deliver sharper image quality, the new monitor filters are made of optically coated glass, which decreases bothersome glare. Glare/Guard filters are accepted by the America Optometric Association (AOA) as meeting VDT (video display terminal) glare reduction specifications.

Glare/Guard's new filter does prove to be unreadable from the right and left side of the screen and generally provides a clear monitor image for the user as long as you view the monitor straight on. Occasional head movements from left to right could result in some blurry moments, but for the most part, the monitor is easy to see through the filter, and screen glare is significantly reduced.

Glare/Guard offers different frame styles to fit all monitors, including those for IBM-compatible PCs, Macintosh monitors, and notebook displays.

Available now, the new products are marketed and distributed through computer distributors and dealers, computer and office superstores, mass market retailers, value-added resellers, and consumer electronics retailers. The Optima 1800 desktop filter has an estimated street price of $99.99, and the Traveler 2000 notebook filter is estimated at $69.99.

For More Information:

Glare/Guard
Glare Guard Division, Optical Coating Laboratory Inc.
(800) 545-6254 ●

Eastern Mind Invades The West

As disconcerting as it is original, *Eastern Mind* requires players to embrace the tenets of Eastern philosophy in order to win the game.

One of the hottest games in Japan is coming stateside, and it's bringing a piece of Eastern culture with it. *Eastern Mind: The Lost Souls of Tong Nou* is one of the first computer entertainment products to successfully merge the traditions and beliefs of an Eastern culture with the technology of Western science.

In Eastern Mind, you take the role of Rin, who has been dispossessed of his soul. Rin decides to travel to the island of Tong Nou to rescue his soul before he loses it forever. During his journey, he must explore five artfully constructed lands in search of certain instruments and tools that will help him finally regain what he's lost.

Like the wildly popular American game, *Myst*, Eastern Mind requires participants to pay careful attention to details. Every object and person encountered offers a hint or clue that will help you complete your mission. Participants must use their creativity to understand these clues and proceed through the different lands. The plot is complemented by fantastic original art and a driving musical score.

The most intriguing aspect of Eastern Mind and the feature that most distinguishes it from other popular adventure games, though, is that Eastern Mind is based on the principles of oriental philosophy, particularly the belief in reincarnation. This instantly becomes evident to participants who discover that they must actively choose to die nine times during their quest so that they can proceed to higher levels of being and win the game.

This novel quality of Eastern Mind will attract avid adventure-gamers, but it could also prove disconcerting to the parents of some players. After all, the concept of purposefully dying in order to reach a higher spiritual dimension points toward self-sacrifice at one end of the spectrum and suicide at the other, neither of which is very pleasant nor heroic in our culture.

Nevertheless, basing an adventure game on Eastern philosophy creates an ingeniously original plot in a market of stagnant and borrowed ideas. The award-winning artistic elements of Eastern Mind, specifically the graphics and music, also are deserving of praise. Eastern Mind, which is sold directly from Sony for $59.99, is indeed a worthy accomplishment in interactive, computerized, multimedia art.

For More Information:

Eastern Mind: The Lost Souls Of Tong Nou
Sony Interactive PC Software America
(800) 438-7794
(415) 655-5683 ●

It's All In The Wrist

It's light, it's easy, and it only takes a flick of the wrist for maximum control. It's the only mouse that can be used both on and off the desktop, combining standard on-the-desk mouse features with in-air, free space movement.

Gyration Inc. gives you GyroPoint Desk to be used as a standard mouse for word processing, spreadsheets, or database applications. Or you can pick it up, rotate it, and activate the miniature gyroscope inside that controls the cursor on the screen, moving it as you move your wrist. You even can lean back in your chair and comfortably activate this little air-born mouse. Until GyroPoint Desk, today's controller devices, such as joysticks, trackballs, and mice, were all antiquated and cumbersome and didn't provide the in-air freedom found in remote control devices.

GyroPoint Desk lets users move the computer cursor by picking up the lightweight device, then moving their wrists in the direction they would like to move it—up, down, left, right, or diagonally. Inside the product is a miniature gyroscope that senses the motion and moves the cursor in the corresponding direction. The ergonomic mouse provides 360 degrees of motion. The interactive pointer is Plug-and-Play compatible with Windows 95 and Macintosh computers and all leading software applications.

For the most part, the mouse is very easy to use but can take a little practice to get used to. The slightest movement will send this mouse scurrying across the screen. At times, it can be a little difficult to hold your wrist steady. The mouse is activated easily once you pick it up and can be held in any position at any distance. It does not have to be pointed at the computer screen.

Available now, GyroPoint Desk is being sold through computer dealers and direct from Gyration's toll-free phone number. The product has a manufacturer's suggested retail price of $149, which includes a one-year warranty.

For More Information:

GyroPoint Desk
Gyration Inc.
(800) 316-5432
(408) 255-3016 ●

MSBACKUP Prevents Data Disasters

It was Benjamin Franklin who first said, "Nothing is certain but death and taxes." Of course, he didn't know about PCs. Otherwise, his list might have included computer glitches, which are as inevitable as night and day.

Most of us, despite this constant threat of data loss, are bad at backing up our data. We do it reluctantly, only after our hard drive crashes or goes bad. But protecting one's labor doesn't have to be hard work. There are many ways to do the job. One simple method is to use MSBACKUP, a handy DOS utility. In this article, we'll explore MSBACKUP until you're ready—perhaps even anxious—to do backups.

Preparing The Backup

If you're in Windows 95, restart your PC in DOS mode. (Some DOS programs won't function while Windows is active.) Type **msbackup** at the prompt.

The first time you run MSBACKUP, it checks the configuration of your components to make sure everything's correct. Then it performs a sample backup, prompts you to insert diskettes, and compares the backups to the original files.

If your machine passes the test, you'll see a screen with four buttons—Backup, Restore, Compare, and Configure—and Quit. Let's examine each one in turn.

The Backup screen provides several settings. The most obvious ones are Backup From and Backup To. Pick the disk drive you're backing up from (usually C:, unless you're on a network) and the drive you're backing up to. Clicking the latter gives you a choice of diskette drives (usually A: and B:) and the formats they support. Or you can back up to another spot on your hard drive or the network.

Unless you have a tape drive, you'll rarely want to back up your entire hard drive, especially with today's megadrives of one gigabyte or more. Rather, you should protect only the critical data files (not program files) you can't bear to lose. To do this, click Select Files. MSBACKUP scans your hard drive, then presents a directory display much like that of Win95's Explorer. Here you can select only those files you wish to back up. Click each directory or file as shown in the photo on the next page and then Include, which gives you the Include Files dialog box. If you've chosen a directory, you can edit the choice to include or exclude individual files or click OK to accept it. Check marks now indicate the files you picked. Similarly, click a directory or file and then Exclude to omit a previously selected item. By adding and subtracting files like this, you can create a custom list of exactly the items you want.

Two other options are helpful. The Special button lets you choose files by a range of dates or exclude copy-protected, read-only, system, or hidden files. The Display button lets you alter the sort order of the file display or filter it, making it easier to find files.

Back at the main Backup screen is an option labeled Setup File. Now it shows only one file (Default.set). A setup file is a list of files you want to back up, such as the file selections you just made.

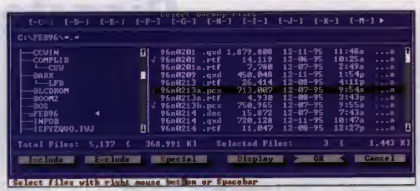
To save your selections, click File on the menu bar, then Save Setup or Save Setup As. You can save them as Default.set or under another name. This lets you define multiple save sets so you can perform customized backups repeatedly. This is particularly useful on a network, where the default may be a system backup. If you already have a setup file other than Default.set, click the file shown, select a file from the resulting list, and click Open. The Backup screen now should say *x* files are selected for backing up. Next, choose the Backup Type for the current selection. The alternatives are Full (all files), Incremental (only the files that have changed), or Differential (only those parts of the files that have changed). A full backup is the most comprehensive, but it takes the most time. The best option is to do a full backup once each period (say, each week), then do an incremental backup each day.

Finally, the Options button offers several choices for fine-tuning. For instance, MSBACKUP can verify, compress, or password-protect your data as it backs it up. You can change the options if you want, but the default settings are fine.

You're ready to begin, so click Start Backup. The program creates something called a backlog catalog on your hard drive, then prompts you to insert a diskette. In a few seconds or minutes, it does the backup.

Understanding The Backup

Exit MSBACKUP, and perform a directory of the diskette by typing **dir a:** at the C> prompt. You'll see a file with a name such as Cc60201a.001. Corresponding to this is a backup catalog in your DOS directory with a name such as Cc60201a.ful. The backup catalog contains information about files you backed up. This includes names, sizes, and attributes. When you restore files, you can load the catalog and select files from it.



```
                      Select Backup Files
  [-C-]  [-D-]  [-E-]  [-F-]  [-G-]  [-H-]  [-I-]  [-J-]  [-K-]  [-M-] ►

C:\FEB96\*.*

 ├──CCWIN             96n0201  .qxd 1,079,000  12-11-95  11:48a  ...a
 ├──COMPLIB         √ 96n0201  .rtf    14,119  12-06-95  10:25a  ...a
 │  └──CSU            96n0201a.rtf      7,700  12-07-95   2:49a  ...a
 ├──DARK              96n0209  .qxd   450,040  12-11-95   1:54p  ...a
 │  └──LPD            96n0213  .rtf    26,414  12-08-95   4:11p  ...a
 ├──DLCDROM           96n0213a.pcx    713,007  12-07-95   9:54a  ...a
 ├──DOOM2             96n0213a.rtf      4,930  12-08-95   3:43p  ...a
 ├──DOS             √ 96n0213b.pcx    750,965  12-07-95   9:55a  ...a
 ├──FEB96      ◄      96n0214  .doc    15,072  12-07-95   7:43a  ...a
 ├──INFOB             96n0214  .qxd   720,120  12-11-95  10:47a  ...a
 ├──ISFVZQUO.TWJ      96n0214  .rtf    11,047  12-08-95  12:27p  ...a

Total Files:  5,137 [   368,991 K]   Selected Files:     3 [     1,443 K]

 Include    Exclude    Special     Display   ► OK ◄   Cancel

Select files with right mouse button or Spacebar
```

The Select Backup Files screen lets you browse your drives and streamline the backup process to include only the files you deem important.

The catalog's name has a specific meaning. Let's look at the meaning of parts of Cc60201a.ful:

CC	The range of disks backed up. In this case, you backed up only C:, so the disks range from C: to C:.
6	The last digit of the year of the backup (e.g., 1996).
02	The month of the backup (e.g., February).
01	The day of the backup (e.g., the first).
A	The iteration of the backup. The program designates the first backup done on a particular day A, the second B, and so forth.
FUL	The type of backup. The alternatives are full (.FUL), incrmental (.INC), and differential (.DIF).

The backup file has the same file name but a different extension. The .001 indicates it's the first diskette used in a backup. If MSBACKUP required more than one diskette, it would call subsequent files Cc60201a.002, Cc60201a.003, etc.

Restoring The Backup

Return to MSBACKUP. To restore backup files, click Restore from the initial menu. The settings resemble those in Backup. For the Backup Set Catalog, you'll generally want the newest catalog, which is highlighted. Or you can click for a list of catalogs. You then can load an older one.

Under Restore From, you can choose the drive where you saved the backups. Under Restore To, you can choose to restore them to their original or other locations. Under Restore Files, click the drive indicator (e.g., [-C-]) to restore all files in the backup. Or click Select Files to restore only certain files, as you did when you backed them up.

The Select Files button again takes you to a directory display. You need only highlight a directory or file and press the spacebar to pick it. Again, you have options to select files by a date range or file attribute, or to sort them in another order.

Once you've chosen files to restore, return to the Restore screen. An Options button lets you customize the restore, and a Catalog button lets you retrieve and load backup catalogs from other locations. Normally, you won't use these.

To execute the restore, click Start Restore, and follow the instructions about inserting diskettes.

Other Options

The next MSBACKUP function is Compare. This lets you compare backup files in a catalog to those still on the hard drive. It lets you know which files you've edited since the backup so you don't overwrite newer files with older ones. This screen looks like Restore, which isn't surprising. In both cases, MSBACKUP accesses the backup files. The difference is, Restore reads them and writes them to disk, while Compare reads them to do a comparison.

Again, you select a catalog to compare from and to locations, and all or selected files. Start the compare function, and MSBACKUP analyzes the files. Its report notes any discrepancies.

The final MSBACKUP option is Configure. Its main buttons are Video and Mouse, Backup Devices, and Compatibility Test. Since you configured MSBACKUP when you first ran it, you shouldn't have to do it again. The only time you'll need Configure is when adding or modifying your computer's components, or when something goes wrong.

Besides all the options in the full-screen mode, you can run MSBACKUP from the DOS command line. Suppose you have a setup file called Daily.set that specifies the files you want to back up every day. To do this backup without having to reselect everything, simply type:

```
msbackup daily
```

Although MSBACKUP has many capabilities, it also has some limitations. Among these are:

- The MSBACKUP program files must be located on your hard drive, and you must start MSBACKUP from the hard drive.
- You must have at least 512 kilobytes (KB) of memory free to run MSBACKUP. If you don't, it will abort at some point with an insufficient memory message. If this happens, make sure you have enough memory, terminate all memory-resident software, and try again.
- The MSBACKUP included with DOS 6.22 won't work with backups done with the BACKUP command (DOS 5.0 and older). For these backups, you'll need the RESTORE command. Also, the latest MSBACKUP version may not restore backups done with DOS 6.0 or 6.2. If it doesn't, find your DOS distribution diskettes and load an older version of MSBACKUP.

For more information on MSBACKUP type **help msbackup** at the DOS prompt, or click the Help menu within MSBACKUP. ●

by Robert Schmidt

Juggling Windows

Do you waste valuable time clumsily trying to work with several windows at once? Perhaps you need a few shortcuts to help quickly organize your desktop and manage multiple documents at the same time. Juggling windows in Windows 3.1 is quick and easy once you master the following tasks.

To begin with, there are two ways to activate a window. The first is through the menu. Open the Window menu (either in a program window or in Program Manager), and select the desired document or application. If an active window is visible on the desktop, clicking the window will make it the active window.

On The Move

When a window is in your way, it's easy to move it to a new location. Simply move the arrow to a position over the title bar, and press the left mouse button. While holding the button, drag the window to a new location. (Note that this won't work with **maximized** windows, which fill the entire screen.) The gray rectangle that follows your arrow around the screen is an outline of your window. Once the window outline is in its preferred location, release the mouse button. If you decide to cancel the move midway, however, press the ESC key before releasing the button.

Remember that you can't move windows outside the main window in which they lie. For example, you can't move the Accessories window outside the Program Manager window.

You may need to change the size of a window to view icons that currently are hidden. Place the arrow over any edge of the window. When the arrow is in the correct position, it will have two heads, each signifying a direction in which the window can be sized. If your arrow is on the left or right edge, for example, you will size the window horizontally. To size it vertically, place the arrow at the top or bottom edge. Press the left mouse button, and drag the edge of the window until it has reached the desired size. The gray outline signifies the size of the window. When you release the mouse button, the window will fill the area of the outline. Once again, you can press ESC before releasing the button if you change your mind.

To resize a window vertically and horizontally at once, drag from the window's corner instead of an edge.

A New View

If a window isn't in use, you can turn it into an icon by minimizing it. On the title bar of a window, there are two buttons at the extreme right. One has an up arrow and the other a down arrow. Click the down arrow to change the window into an icon. To restore the window, double-click the icon. To maximize an open window, click the up arrow.

When an application window (and the document window within it) is maximized, it covers the entire screen, and the document shares its title bar with the application name. To restore the window to its original form, click the double arrow at the right of the title bar. In *Microsoft Word*, for example, a maximized Word window and maximized document window produce two double-arrow boxes in the upper-right corner. Clicking the lower of the double-arrow boxes shrinks only the document window, while clicking the upper box shrinks the entire Word window.

If you'd prefer to access only one application at a time and would like that application maximized, you still can access other open applications by using the Task List, or the ALT-TAB command.

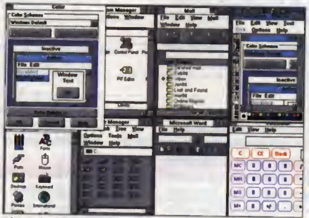
Access the Task List by pressing CTRL-ESC. The large box located in the upper half of the Task List dialog box contains a list of the applications that are currently open. To select an application, click its title, and subsequently left-click the Switch To button at the bottom of the box. A quicker alternative is to double-click the desired application title.

It's even simpler to juggle windows when you use the ALT-TAB command. Hold the ALT key down while pressing the TAB key repeatedly until you see the title of the application you want to select. When you have located the appropriate application, release the keys, and that application will become active.

Try The Cascades

If you're working on several applications at once and want easy access to each of them, use the Tile and Cascade commands to display all open applications in an organized fashion.

To organize your applications into a Tile format, press CTRL-ESC, and click the Tile button on the Task List. The application windows will form vertical tiles. To Cascade, click the Cascade button in the Task List dialog box. The open application windows will automatically configure themselves into a stacked arrangement. Tiling and Cascading let you see multiple documents at once, providing the convenience of activating open applications with one click of the mouse. ●



The Tile feature lets you view all open windows simultaneously.

by Vicki Burbach

Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This monthly section is your one-stop guide to learning these crucial first steps in DOS, OS/2 Warp, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

NAMING FILES

One of the most basic functions a computer offers is the ability to save documents for future revisions or review. To save a document, you must give it a descriptive name you can remember so you will be able to find it later. What's in a name? It depends on the operating system you use.

DOS

You must name files in DOS in a way your computer can understand. That means following the "eight dot three" rule that states the file name can contain a total of up to eight characters, a period, and an optional three extra characters. The first eight characters constitute the actual name of the file, and they can be any of the following: the letters A to Z; these 11 symbols (not including the semicolon) $ # @ ! ({ } ' _ - ~ ; and the numbers 0 through 9. You cannot use a blank space, comma, backslash, period, semicolon, or any of the other characters not shown above, and it doesn't matter if you use upper- or lowercase letters. Next, a period separates the name from the final three characters that make up the extension. The extension provides a clue to the file's contents. The .DOC extension indicates a *Microsoft Word* document, for example, and the .BMP extension indicates a bit-mapped graphics file.

OS/2 Warp

The size of your file name in OS/2 Warp depends on how you installed your operating system. Those who used the "easy install" probably have the file allocation system (FAT), and those who used "custom install" probably have the high performance file system (HPFS). If you have the HPFS, your file name can use up to 254 characters and all the periods you want. If you have the FAT file system, you must follow the 8.3 rule described above.

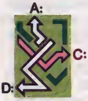
Windows 3.1

This Windows version, because it is an operating environment based on DOS, follows the 8.3 rule described above. Extensions can be very helpful when it comes to organizing files in Windows. In File Manager's View menu, you can sort file names by name, type (extension), size, or date. Most applications also let you use the Save File As Type pull-down box while you are in the File menu's Save As selection to change a file's extension and structure.

Windows 95

The ability to create longer file names was one of Win95's most highly touted features, and for those computer users who like to get really descriptive, it can be a great tool. A file name in Win95 can: have up to 255 characters; include numbers, characters, and a mix of upper- or lowercase letters; and have as many spaces as you want. For those Win95 users who still run programs through DOS and Windows 3.1, Win95 automatically creates a recognizable 8.3 alias for file names that are too long. For example, a document named Cheap Internet Box becomes Cheapi~1.doc.

CHANGING DRIVES



Most of us spend a great deal of time working on our hard drive, which is usually identified as the C: drive. But when it's time to save a document onto a diskette using the diskette drive (usually your A: drive) or to install a new program using your CD-ROM drive (usually D:), you'll have to change drives.

DOS

To change from your hard drive to a diskette drive, make sure you have the correct diskette in the PC, type the letter of your diskette drive, add a colon, and press ENTER. For example, if your diskette drive is A:, you would type a:, and press ENTER. You are now in the A: drive. When installing software, you would type **install** now. To view the directories in this drive, type dir. Type dir/? to see options for using the DIR command.

OS/2 Warp

To display the contents of a drive in OS/2 Warp, double-click the OS/2 System icon, then double-click the Drives icon. After the different Drive icons appear, double-click the icon that represents the drive you want to view.

When using a Save function in Warp and Windows, you can designate which drive to save files to in a pull-down box labeled Drives.

Windows 3.1

To view another drive in Windows, open File Manager, and examine the Drive icons located at the top left of the screen. Click the icon that represents the drive you want. The new drive's icon will be highlighted with a box, and its directories will appear. A shortcut for changing drives in Windows is to hold down the CTRL key and push the key that corresponds to the drive's letter.

■ Windows 95

To look at the contents of a different drive in Win95, double left-click the My Computer icon, then double left-click the icon that represents the drive you wish to see. The directories residing in that drive will appear.

CHANGING DIRECTORIES

During the course of normal computer use, you may find you've accumulated an abundance of files, each containing important information. To keep all of those files straight, they can be organized into directories and subdirectories. Directories can reside on your hard drive or on individual diskettes. Once you've accumulated a number of directories on your computer, you must learn how to move among them to locate the files you need.

■ DOS

To change directories in DOS, type cd and the name of the directory you would like to view. For example, if you are looking at a diskette's directory list (type **dir** at the A: prompt) and you want to examine a directory listed there as WORD, type **cd word** at the prompt. When the A:\WORD prompt appears, type **dir** to view the contents of the new directory. After you have changed to several different directories or subdirectories, you may decide you want to return to your root directory where it all started. Simply type **cd\**, and you will return to the root directory. Typing **cd..** returns you to the parent directory of the current directory. For example, typing this command at the C:\BOOKS\NOVELS prompt will take you to the C:\BOOKS directory.

■ OS/2 Warp

OS/2 Warp uses folders rather than directories for organization. Folders can contain documents, programs, or other folders. The desktop folder fills the entire screen, and it contains all of the system's other folders. It's basically the root directory for the operating system. To change directories (folders), locate the icon of the folder you want, and double-click it.

■ Windows 3.1

To change directories in Windows, you can go through File Manager. Open File Manager, find the correct directory, and click its icon. The new directory will open and become highlighted, with its subdirectories and files appearing to the left. Or you can double-click the icon, and the directory will open with its directory tree appearing on the left and its files on the right.

■ Windows 95

There are a number of ways to view your computer's different directories (or folders) in Win95. The approach we will take is through the My Computer icon. Double left-click the My Computer icon, double left-click the correct drive, then double left-click the correct folder.

FREEING MEMORY

A PC won't run its best without enough free memory, and many programs require a large amount of memory to run at all. Most major operating systems offer simple procedures that can free up some of your computer's memory and make it run better.

■ DOS

DOS separates memory into four categories: conventional, upper, expanded, and extended. To find out how much memory your computer has, and how it is being used, type **mem** at the C> prompt. This screen will display the total amount of conventional, upper, reserved, and extended memory in your computer. (It will not display expanded). If you decide you need to free up some memory, you can run the MemMaker program in DOS versions 6.0 and newer. Type **memmaker** at the DOS prompt. A welcome screen will appear; to continue, press ENTER. The program will ask if you want Express or Custom setup. Choose Express unless you are a very experienced user. From here on, simply follow the on-screen prompts; the program will guide you through the process, though it does most of the work of rearranging things for optimum memory use. Don't be alarmed when MemMaker reboots your computer; this is normal. After MemMaker has completed its work, it will display the improvements it has made on your system. If you encounter any problems with your computer or its programs after you have run MemMaker, you can instruct your PC to return to its original memory configuration. To do this, type **memmaker/undo** at the DOS prompt, and follow the prompts.

■ OS/2 Warp

A few tips for freeing up needed memory in OS/2 Warp include: closing open programs when you won't need them again; closing folders you won't need; and moving commonly used functions out of their folders, on to the desktop, and then closing their folders. You also can free up hard drive space by installing only the program functions that you want and need and by deleting programs and files you no longer use. For example, if you don't need the OS/2 Warp Tutorial anymore, you can delete Tutorial.hlp in OS2\HELP\TUTORIAL.

■ Windows 3.1

To free up memory in Windows, close the programs you're not using, and delete files you do not need. You also can exit Windows, go back to DOS, and complete the process for MemMaker described above.

■ Windows 95

Win95 is designed to automatically configure your PC's memory to maximum efficiency, and it uses less conventional memory for its **device drivers** (software that lets PCs and hardware communicate) and other operations than other systems. Closing windows and programs you're not using and deleting files you don't need also will help. ●

by Tom Mainelli

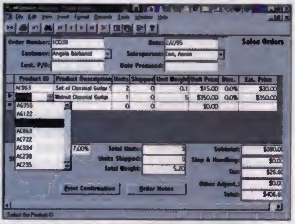
MS Business Pack Offers Ready-Made Documents

If you're ready to make your small venture more computer-literate but aren't yet brave enough to create your own documents from scratch, the *Microsoft Small Business Pack* may fit your needs. The Pack is a Windows 95 add-on requiring *Microsoft Office Standard Edition* and *Microsoft Access*, or *Microsoft Office Professional Edition*. The Small Business Pack won't run without the Office product suite.

The Small Business Pack adds an icon to the Microsoft Office toolbar. Left-click this icon, and the toolbar scrolls to reveal the Pack's six functional areas that offer ready-made documents for your company. Each area has several modules based on Office's underlying engines. These include documents in *Microsoft Word*, workbooks (sets of spreadsheets) in *Microsoft Excel*, databases in Access, and charts in *Microsoft PowerPoint*.

The best way to describe the Pack is to summarize the areas and their modules:

- Financial: Workbooks for accounts payable and receivable, balance sheets, income statements, expense reports, and other financial functions.
- Management: Documents for letterhead, memos, and reports, and a human resources database with employee records and job listings.
- Marketing: Documents for brochures, newsletters, press releases, special-announcement postcards, and presentation slides in colorful formats.
- Operations: Documents for account statements and purchase requisitions; workbooks for invoices, timesheets, and inventory; and databases for business transactions and time billing.
- Planning: Documents for business plans and pro forma income statements; workbooks for five-year projections, business analyses, and other financial assessments.
- Sales: Documents for estimates and product fact sheets, workbooks for sales goals and projections, and a database for sales and customer tracking.



Order Number: 10039
Date: 2/2/95
Sales Orders

Product ID	Product Description	Units	Shipped	Unit Weight	Unit Price	Disc.	Ext. Price
AC863	Set of Classical Guitar S	2	0	0.1	$15.00	0.0%	$30.00
	Walnut Classical Guitar	1	0	5	$350.00	0.0%	$350.00
		0	0		$0.00		

Total Units: 3
Units Shipped: 0
Total Weight: 5.20
Subtotal: $380.0
Ship & Handling: $0.0
Tax: $26.6
Other Adjust.: $0.0
Total: $406.6

The Sales Order section of the Microsoft Small Business Pack's Sales Database helps fill customer orders.

Because the Small Business Pack is so comprehensive, there's not enough room here to review all its modules. But here are some general comments on each type of module.

Workbooks. The Small Business Pack's Excel workbooks are well-designed with a clean, uniform look. Each has at least two spreadsheets: an About sheet with detailed instructions and a main Template sheet. Its navigation buttons mean you can work without knowing anything about spreadsheets.

Documents. The Word documents offer businesses a standard publication style, but they're not as user-friendly as the spreadsheets. The instructions are in the body of documents, forcing you to browse through them. Furthermore, you must delete this text, replacing it with your own.

Databases. The Access databases are well-designed and easy-to-use. The screens are solid and fairly elaborate, though they lack some features found in advanced business systems.

Charts. The PowerPoint chart templates are pleasing, but they're not geared specifically to businesses. PowerPoint already has charts in several styles, so these are merely extras.

The Small Business Pack has a couple of nice aids. One is an online Business Guide, which explains basic business decisions and connects you to modules in the Pack. Another is the Answer Wizard, a help facility that accepts English-language queries and points you to the appropriate tools for business situations.

The Pack has some key limitations, however. For example, its templates, forms, and reports are pretty fixed. Creating a nonstandard brochure or newsletter, for example, requires significant effort. Unless you know what you're doing, you're better off leaving the modules alone. Besides, changing them defeats the purpose of having them built for you.

The modules also don't really interact. That is, numbers from one don't carry over to others. While Access databases have links, new sales orders, for instance, won't affect totals in the accounts receivable spreadsheet. The modules don't form an integrated system.

So who is the Pack for? Well, if you're self-employed or running a very small business, the forms and templates may be too much. If you're managing by stuffing receipts into envelopes, you probably don't need equipment inventory or past due accounts.

When your operations reach a certain level of complexity, however, you'll want more sophisticated tools. A dedicated payroll program tracks not only employees and their salary history but also vacation time and health benefits. It integrates with accounting packages where entries from orders and invoices roll over to various accounts and then to the bottom line. The minute you test the Pack's limits, however, you're ready for more powerful software.

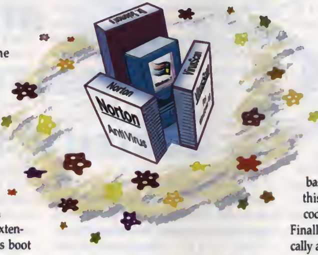
The Pack's target is clear. It's for entrepreneurs who are buying Microsoft Office and also are thinking of automating their records. If you're tempted to invent spreadsheets or databases to manage your work, save yourself the effort. The Small Business Pack already has just what you need. ●

by Robert Schmidt

For More Information:

Microsoft
(800) 426-9400
(206) 882-8080

Ward Off Infections Under Windows 95



Deadlines, crucial reports, and vital presentations have one thing in common—the need for instant computer access. The last thing you want when working under pressure is a "sick" computer.

But, as you know, life isn't always convenient. Rogue programming code called **viruses** sometimes finds its way into healthy systems. The uninvited viral visitor spreads by replication. It attaches itself to an **executable** application (files with the extension .BAT, .EXE, or .COM) or a disk's boot sector. Then it clones whenever you boot, or start up, from an infected system or launch the infected file. If not removed, the virus could precipitate serious damage, eventually rendering your computer inoperable.

Even if you never share diskettes with others or download applications from online services, your computer is not immune. Over the years, dozens of software vendors have inadvertently bundled viruses hidden in files in their shrink-wrapped products. And, as the world becomes increasingly connected through the Internet, your system's chances of contracting infection have increased dramatically.

If you upgrade from Windows 3.1 to Windows 95 or purchase a new computer with Win95 already installed, you must install 32-bit antivirus protection designed specifically for Win95. While most existing DOS/Windows 3.x viruses can infect machines running Win95, your old antivirus software won't work. The following programs are designed to provide antivirus protection under Win95. Versions of each product also are available for Windows 3.1/3.11 and Macintosh. (For general antivirus information, see the article, "Inoculate Your System Against Viruses.")

■ Dr. Solomon's Anti-Virus Toolkit

Dr. Solomon's Anti-Virus Toolkit For Windows 95 by S&S Software International comes with everything needed to detect and repair damage caused by more than 7,500 file, Master Boot Record, and boot sector viruses, including those identified as mutating or polymorphic. As an added bonus, it includes printed and electronic versions of Dr. Solomon's Virus Encyclopedia, providing references on hundreds of virus strains.

Dr. Solomon's contains WinGuard, a 32-bit native **virtual device driver (VxD)** offering virus protection under Win95. (VxDs are similar to **terminate-and-stay-resident** device drivers, or **TSRs**, that run unseen in DOS until called to the screen by the user.) At installation, Dr. Solomon's asks if you'd like to run WinGuard automatically at Win95 startup. If you choose this option, WinGuard runs in the background, scanning files and disks before letting you access them. Dr. Solomon's also includes VirusGuard, a DOS memory-resident program that intercepts viruses and prevents infected files from running.

FindVirus, another 32-bit Dr. Solomon's utility, offers on-demand scanning, letting you detect, identify, and repair virus-damaged files in several popular compressed and archived formats. It also detects (but doesn't repair) viruses caused by the potent *Word Macro Virus*. This virus, which appeared in August 1995, was the first multiplatform virus capable of infecting Windows 3.1, Windows 3.11, Win95, Windows NT, and Macintosh "data" (rather than executable) files. It easily transferred viral code between PC and Macintosh since both Windows and Macintosh *Microsoft Word* applications share many file formats. Because the virus attacks a default template, every file created with File, New or saved with File, Save or File, Save As falls prey.

With ViVerify for Win95, Dr. Solomon's creates a fingerprint database for all installed executable files. It uses this data to detect changes in executable code, which can indicate a virus' presence. Finally, Scheduler runs FindVirus automatically at a time you specify.

The current version of Dr. Solomon's can't repair boot and partition sectors on hard drives. For that, you must reboot in DOS mode and run the Dr. Solomon's toolkit for DOS. Similarly, before you install the package, you must run FindVirus from the Dr. Solomon's toolkit for DOS to verify the integrity of your PC's memory as well as its boot sectors, partition sectors, and files on the hard drive. A copy of the Anti-Virus Toolkit for DOS ships with the package. It scans for 7,089 viruses, trojans, and variants. Dr. Solomon's doesn't create a "Rescue Disk" at installation, although it does come with an Emergency detect-and-repair diskette that works as long as you boot from a clean, uninfected, startup diskette.

S&S offers toll-free technical support for virus emergencies, seven days a week, 24 hours a day. It also provides quarterly antivirus updates to registered users and options for monthly updates. Dr. Solomon's World Wide Web page (http://www.drsolomon.com) offers downloadable freebies (including a full version of FindVirus), plus news about recently discovered viruses.

■ Norton AntiVirus

The first antivirus package for Win95, Symantec's *Norton AntiVirus*, offers 32-bit virus protection. As a result, it won't run under DOS or Windows 3.x. Like the other programs in this review, Norton supports Win95's long file names. Scanning for viruses (even in compressed files), it removes and repairs infected files (when possible), and it can operate in the background. In addition, it features an "inoculation" mode that monitors for unknown viruses through rule-based integrity checking.

Norton includes several parts. The first line of defense is Auto-Protect, which can be configured to load at startup. Based on a 32-bit virtual device driver, it works in the background, but it can be turned on or off without rebooting. Scanning program files whenever they are accessed or whenever a file tries to copy itself to the hard drive, Auto-Protect announces suspicious activities and prevents infected files from getting into the PC. If you download online files, you'll find Auto-Protect particularly appealing.

Norton's 32-bit Norton AntiVirus offers customizable prevention, protection, and repair capabilities, letting users determine what is scanned, what alerts appear on-screen, and the steps to be taken if an infected file is found. Scheduler lets users scan for viruses at specific dates and times. It runs in the background if you're working at the PC when the scan begins. Norton's Virus List provides users with an electronic database of known viruses, their aliases, characteristics, and modus operandi.

As an added precaution, Norton creates a bootable Rescue diskette set at installation. This provides backup security in case of infection. Unfortunately, the setup doesn't copy all necessary files. You must add the NAVBOOT application manually to the second Rescue diskette for the set to work correctly. To scan for viruses prior to installation, you must run NAVBOOT from the DOS prompt.

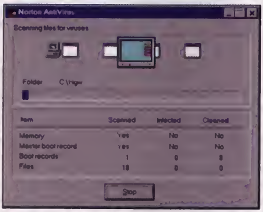
To guard against the Word Macro Virus you first must connect to Symantec's bulletin board system (BBS), Web page, or sites on America Online, CompuServe, or The Microsoft Network to download, then install Macro Virus definitions. Moreover, Norton will scan for these viruses only if you add .DOT and .DOC files to the What To Scan section. Since Norton can't detect the Macro Virus from within Windows, you must restart your PC in DOS mode to scan the hard drive with Navboot.exe.

Symantec support includes a 24-hour faxline and newsline, plus updates on Symantec's BBS, online services, and the Internet Anti-Virus Reference Center Web Page (http://www.symantec.com). A free, DOS-based antivirus scan utility, called *NAVScan*, is available for downloading. Use it to detect and remove viruses before installing Win95. Symantec's quarterly AntiVirus Update Service costs $69.

VirusScan

Claiming nearly 70% of the antivirus market, McAfee Associates markets a range of antivirus software products, including *VirusScan For Windows 95*. This provides superior integration with the Win95 Explorer, but it is less robust than either Dr. Solomon's or Norton AntiVirus. Once installed, you can run it by right-clicking. Simply launch Explorer, then right-click any folder, drive, .EXE, or .COM icon. A Context menu pops up with Scan For Viruses as an option. Right-click access also is available from Win 95's My Computer window.

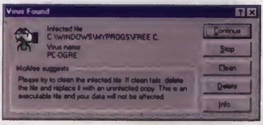
The current version of VirusScan offers support for long file names and provides automatic virus protection through a DOS TSR. McAfee plans to replace the existing TSR with a 32-bit VxD in the upcoming version 2.0. The TSR provides real-time background monitoring of activities (such as file and program execution), scanning automatically at startup. Users can scan on demand and have VirusScan remove suspect code and repair infected files.



Folder C:\Higw

Item	Scanned	Infected	Cleaned
Memory	Yes	No	No
Master boot record	Yes	No	No
Boot records	1	0	0
Files	18	0	0

***Norton AntiVirus* offers clear explanations of the system areas it's checking for viral invaders.**



Infected file
C:\WINDOWS\MYPROGS\FREE.C

Virus name
PC-OGRE

McAfee suggests

Please try to clean the infected file. If clean fails, delete the file and replace it with an uninfected copy. This is an executable file and your data will not be affected.

McAfee's *VirusScan* is a market leader in eradicating troublesome viruses.

VirusScan is "smart" enough to detect Win95 or Windows 3.1. If installation detects Windows 3.1, it installs VirusScan for Windows. It won't configure a startup diskette or a rescue diskette. After installation, you can customize program options for the drives, folders, and file types to be scanned. You also determine the actions VirusScan takes when it finds a virus. Like other products reviewed here, VirusScan keeps an activity log with detailed information about scanning and infection results. Unfortunately, there's no virus encyclopedia (although it provides information about those viruses it detects). Moreover, you can't easily disable the scan at startup. The current version also lacks a scheduling engine.

McAfee's *WebScan* (purchased separately) is designed for Web surfers. Offering protection from online viruses, it scans all downloaded files including E-mail attachments. WebScan detects the Word Macro Virus, thereby preventing you from downloading contaminated files. Integrated with Spry's *Mosaic Browser* and *Pegasus Mail*, it works with other browsers (including Netscape's *Navigator*), and it features an Internet access account setup.

McAfee has an online service that lets registered users download new versions of its software. Evaluation copies of all McAfee software may be downloaded for free from the company's Web site (http://www.mcafee.com), the company's BBS, CompuServe, or America Online. Registered users may also purchase two full years of technical support for $60. ●

by Carol S. Holzberg, Ph.D.

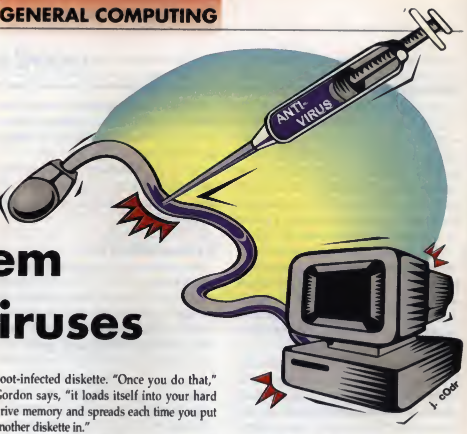
For More Information:

Dr. Solomon's Anti-Virus Toolkit For Windows 95
$125 (list); Mac version, $99 (list)
S&S Software International
(800) 701-9648, (617) 273-7400

Norton AntiVirus For Windows 95
$79.95 (street)
Symantec
(800) 441-7234, (503) 334-6054

WebScan
VirusScan For Windows 95
$45 (street for each)
McAfee Inc.
(408) 988-3832

Inoculate Your System Against Viruses



There are viruses that make you sick, and there are viruses that make you wish you were dead. A flu virus will make you ache all over and maybe cost you a couple of days at work. A computer virus will make your head ache and maybe cost you data files on your home PC or business files worth thousands of dollars.

There are ways to avoid both. While a flu shot can go a long way toward warding off any flu contagion, antivirus software can protect your computer programs.

You might be thinking that contracting a flu virus is much more common than a computer virus. Think again. A November 1995 survey of 1,300 information system security executives showed that 67% of data installations in the United States had been hit with viruses in the last year. Computer viruses rank fourth among information technology financial losses, right up there with PC failure, sabotage, and break-ins.

"Antivirus programs are no longer in the 'nice to have' category," says Scott Gordon, production manager for McAfee *VirusScan*, the leading antivirus product on the market. "If you don't have one, you are at risk."

Technically speaking, a **virus** is defined as any executable program that replicates itself and spreads to other executable programs in an unsolicited manner. Other threats (which are not viruses) to user systems include worms, Trojan horses, and logic bombs.

Currently, the most common virus is probably *Form*, which is a **boot virus**. It begins to contaminate your hard drive once you install a boot-infected diskette. "Once you do that," Gordon says, "it loads itself into your hard drive memory and spreads each time you put another diskette in."

There are new viruses being introduced as you read this. Gordon says that researchers at McAfee, which has two-thirds of the antivirus market, identify 100 new viruses each month that are aimed at Intel-based machines. The average virus infects 142 PCs.

McAfee's large market share helps it stay abreast of developing problems. "The more users, the more customer-driven alerts we receive," Gordon says. "We also have underground surveillance on bulletin boards and various places on the Internet." Still, viruses flourish.

Easy Infection

Viruses spread innocently enough. Let's say someone finds an intriguing game on an Internet bulletin board, downloads it, and just can't resist bringing it in to show the gang at work. There's just one problem: The game has a virus. It's run on the company network to show everyone, and bang, Virus City. Not only is the user's home PC infected, the company network is infected, too.

Shrink-wrap doesn't mean software isn't infected. Stores sometimes rewrap a piece of returned software without checking for viruses. The original purchaser may have unknowingly tried the software in an infected machine. Last year, publisher Miriam-Webster's accidentally shipped a number of its *Collegiate Thesaurus* applications that were infected with the *AntiEXE* virus. It can happen to anyone.

Users potentially take their computer's lives in their hands every time they cruise the Internet. Viruses are designed to reproduce and proliferate, and any contact between your system and another system is an opportunity for infection. That includes diskettes and any modem connection.

"Only if you don't share software, don't download anything, or don't introduce new diskettes to your system will you be safe," Gordon says. But unlike fire insurance, which any prudent homeowner will buy before there's a fire, computer users often don't think of getting antivirus protection until disaster has struck, either by wiping out files completely or by making them very time-consuming to retrieve.

Difficult To Detect

Keeping up with the miscreants who author viruses, almost always someone with computer programming expertise, is a heavy task. VirusScan and other antivirus software, such as *Norton AntiVirus* by Symantec and *Dr. Solomon's Anti-Virus Toolkit* by S&S Software, offer updates as frequently as a monthly basis. This makes antivirus software more of a service than a product. (See preceding article, "Ward Off Infections Under Windows 95.")

Some operating systems and environments, such as Microsoft Windows, come with an antivirus package. Unfortunately, Microsoft hasn't updated its antivirus in three years. "It is not maintained," Gordon says. "As a matter of fact, when they (Microsoft) get calls, they refer them to us a lot. One of the reasons for the delay on Windows 95 was that they were working on it and ultimately didn't offer a solution. It's too time-consuming; you need a lot of researchers, and you have to get a hold of the viruses and find out what they do."

There are three basic components to a virus. One is a replication mechanism, which spreads the virus; the second is a trigger mechanism, which searches for the right conditions such as date or specific word or phrase; and the third, the payload mechanism, where the damage occurs.

For regular users, detecting a virus before it has done its dirty work is nearly impossible. "Short of already getting hit with a payload, there is no way the average person can tell," Gordon says. "A sophisticated virus will try to hide its actions." A virus can be 100 bytes, and few people are aware of the size of their executable files. They may not notice when they have been hit with a virus.

There was a time when a person could go over a checklist of symptoms that would indicate a possible infection. Some of the items included the system running unaccountably slowly, error messages for no identifiable reason, and low capacity on the hard drive. It's safe to say that if you asked all the users who had experienced those problems to step forward, you'd have quite a crowd on your hands.

"Maybe (the problem occurs because) they just need to defragment their hard drive or some other simple solution," Gordon says. "But the funny thing is, the next time they get those symptoms they won't even suspect it could be a virus, and they ignore it."

Sometimes when users are hit with viruses, their first thought is that they have had a hardware failure. "Boom," Gordon says. "They can't access their hard drive, and they think it's a hardware problem. More likely, it's a virus that has wiped out their ability to access the hard drive."

When hit with a virus, you only can hope the damage hasn't been too significant. First, locate your DOS **system diskette**, which includes files that can start your computer, or buy one at any software outlet. Make sure it is write-protected. (Cover the notch in the 5.25-inch diskettes with a write-protection tab. Slide open the write-protect window on 3.5-inch diskettes.)

Load DOS so that you don't access the hard drive. Then buy an antivirus program, and run it to eliminate the virus problem. You should be back in business.

"If you are at the point where you think you might have a virus, most likely it's already too late," Gordon says. "It's already doing damage."

■ Prevention First

Here are some simple tips for prevention against viruses:

- Make sure all diskettes are write-protected before inserting them in a diskette drive. Once the diskette is write-protected, scan it for viruses before doing anything else.
- Be suspicious of uncharacteristic PC behavior. If routine tasks suddenly cause unexpected results, scan for viruses.

For businesses, here are some additional reminders:

- If your co-workers or employees work at home, make sure they follow the same procedures they do at the office. Diskettes brought from home should be subject to the first procedure listed above.
- Are there some PCs within your organization that should not be included in the antivirus operation? What special precautions should be taken for the company network?
- If files are routinely uploaded from computers outside the company, they should be downloaded directly to diskettes if possible, and they should be scanned for viruses before being used by the rest of the organization.
- Develop a procedure for recording virus infections.
- Create and maintain a policy for virus control. Allocate funding and designate staff for implementation of virus control.

Spending money on something such as virus protection makes home PC users and companies grind their molars, but the expense, like that of any insurance, is worth it many times over when measured against the damage a nasty virus can wreak. ●

by Richard Egan

Shopping For

McAfee, which has two-thirds of the worldwide marketshare for desktop antivirus software (according to a report by IDC, a market research firm based in Framingham, Mass.), is a safe place to start when looking for antivirus products. (For more on antivirus products for Windows 95 see the preceding article, "Ward Off Infections Under Windows 95.")

VirusScan is McAfee's antivirus software for workstations, and it features two components. The detection module is Scan, which will search diskettes, hard drives, network drives, and CD-ROMs for viruses. If an infection is found, Scan can be used to eradicate the virus. The protection module is VShield, which helps prevent viruses from entering the system by scanning files and diskettes before they are accessed to determine if they are infected.

VirusScan reportedly can recognize and eliminate 95% of known computer viruses, and keeping up with the viruses is convenient with McAfee's two-year subscription licensing policy. Customers receive unlimited phone support and monthly updates. The updates are also available on CompuServe and the Internet. McAfee antivirus products sell for about $45.

NetShield is a Novell NetWare Loadable Module that works on the file server to provide comprehensive file server protection. Tested and approved by Novell, NetShield provides real-time virus scanning of all inbound and outbound file activity on the file server. It runs entirely on the file server with no workstation software required.

ROMShield protects workstations from boot viruses. It automatically looks to see if an infected diskette is being used, and if so, stops the boot process until the diskette is removed or replaced with a clean diskette. ROMShield loads into memory before the computer boots and works as a front-line defense against boot viruses.

McAfee's hot new software is *WebScan*, which protects users when they download infected files and E-mail from the World Wide Web. WebScan activates when a user tries to download and save a file. If the file is infected, WebScan will ask the

Installing VirusScan

McAfee boasts that its *VirusScan*, now available for Windows in a 2.2 version, is used in more workstations and servers worldwide than all other antivirus software combined.

Installing VirusScan programs is not like using other software because of the precautions that must be taken to avoid spreading a computer virus. Viruses can be spread when you boot up from an infected hard drive or diskette, or when you run an infected program.

If you already have an infection, running VirusScan may spread the infection to your hard drive or possibly even the VirusScan programs themselves. The VirusScan installation program automatically will perform tasks such as scanning your system, installing VirusScan, modifying your setup files if needed, and activating the protection program.

We installed VirusScan for Windows. In doing so, the Autoexec.bat file was modified so that VShield runs automatically when the computer is started. A Windows program group called McAfee was created and included icons for Scan and VShield. If the install program encounters any previous VirusScan files, it will ask whether it should update them.

To install VirusScan, we started from the C> prompt. If you're running Windows or an application, exit out of it to display the prompt. Insert VirusScan program Disk 1 into drive A:. Change to that drive by typing **a:**. Start the program by typing **install**.

VirusScan first checks for viruses in memory, then on the system and user portions of your drives. You will be kept informed of its progress. Don't worry if nothing turns up; in this case, no news is good news.

After a portion of Disk 1 runs, the program asks you to install Disk 2. More of the program will be entered to your hard drive, then there will be a call for Disk 1 again. Follow the on-screen instructions until VirusScan is fully installed.

If VirusScan found a virus infection, an on-screen message would have announced that a virus had been found in memory. At that point, the user should halt installation by pressing ESC. Don't panic, and don't run any other programs. Go directly to the "If you detect a virus" section in the user's manual so you can eradicate the virus before continuing.

After you've cleaned up your system, you'll be asked to choose a directory for the VirusScan programs. Install will copy the files and make any necessary modifications to your system startup files so that VShield will run automatically when you start your computer.

For the final step, it is recommended that you make a clean startup diskette (directions found in user's manual) that contains the VirusScan program for use in emergencies.

We had no problem installing VirusScan, and our PC got a clean bill of health. ○

Antivirus Software

user whether to delete or save the file. WebScan can be hooked to Internet browsers such as CompuServe's *Spry Mosaic*, Netcom's *Netcruiser*, and Netscape's *Navigator*. When installed, it searches automatically for these browsers on the hard drive and connects.

S&S Software International offers antivirus products for all PC operating systems under the name of *Dr. Solomon's Anti-Virus Toolkits*. Toolkits are available for Win95, Windows NT, SCO Unix, Macintosh System 6.x and 7.x, Windows 3.x, Netware, and OS/2. All seven of the toolkits identify and repair damage caused by cross-platform viruses that infect users of *Microsoft Word for Windows*.

The Win95 and Windows NT versions feature 32-bit versions of *FindVirus*, which detects, identifies, and repairs damage from more than 7,200 filed, Master Boot Record, and boot-sector viruses. The Generic decryption engine in FindVirus fixes damage from encrypted polymorphic viruses, which mutate when they infect files. Each toolkit also includes a Virus Encyclopedia, which profiles viruses detected by the toolkit, and a scheduler, which runs FindVirus automatically.

The suggested retail price for the toolkits is $125. Quarterly updates are sent automatically to users, with monthly updates available.

Norton AntiVirus, from Symantec, is available in both 16-bit and 32-bit applications. This software features Auto-Protect, which provides automatic, transparent protection by scanning program files whenever they are used. The software guards the hard drive while the user continues to work. It will protect the hard drive as the user copies files from diskettes, the network, or the Internet.

Norton AntiVirus lets users configure the response to a virus alert. It can notify users that an infected file has been found, deny access to the infected file, automatically repair it, delete the infected file, or even shut down the computer.

Norton AntiVirus Auto-Protect uses a patent-pending technology to detect viruses that are unknown. It monitors computer activity for signs of a virus trying to replicate itself. Norton Antivirus also includes a scheduler, so users can schedule virus scans that run unattended, either on specific dates or specific intervals. It will run in the background so you don't have to stop working.

The suggested retail for Norton AntiVirus is $129. A quarterly virus description subscription service is available for $69 a year, as are regular upgrades. ○

For More Information:

Norton AntiVirus
Symantec Corp.
(800) 441-7234
(408) 252-3570

Dr. Solomon's Anti-Virus Toolkits
S&S Software International, Inc.
(617) 273-7400
(800) 701-9648

WebScan
McAfee Network Security & Management
(408) 988-3832

Cybercinema

PCs Have Historically Enhanced, And Starred In, Feature Films

Two dozen motion pictures about computers, such as "Johnny Mnemonic," "The Net," "Hackers," "Virtuosity," and "Strange Days," made it to the silver screen in 1995. How did Hollywood studios acquire their current cybercraze?

Big-budget films reflect our culture's interests, or at least the interests Hollywood perceives. Movies, though sometimes considered an art form, are primarily a form of making money. The deal makers choose stories they think will make big bucks. Since Hollywood has noted the explosive growth of PC ownership and the Internet in the 1990s, cybercinema was inevitable.

The convergence between computers and cinema, however, has roots stretching back years before anyone heard of the 'Net or personal computers and is more comprehensive than just movies about computers. Computer games based on movies have been around since the early days of PCs, and computers have helped create special effects in movies for nearly two decades.

But these connections are now growing so rapidly that some have dubbed the swelling synergy between Hollywood studio lots and Silicon Valley labs as "Siliwood." Although cinema and computers dated for many years, in 1995 they seemed to exchange vows at the multimedia altar.

Movies *About* Computers

Most contemporary science fiction movies include references to computers. The machines usually play minor roles or serve only as props. Here we'll look at movies in which computers play a crucial role. Computer-oriented flicks generally contain one or more of the following four themes:

Walking, talking computers. Although this article is about computers as we basically know them, something must be said about robots since they are computers' ambulant cousins, and more (often grade-B) movies about robots have been made than about computers proper. Robots, moreover, have produced some of the most enduring icons in film history.

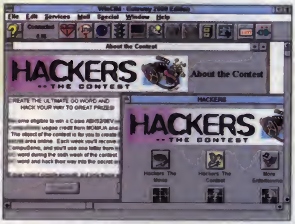
Independent robots, we presume today, are computer-controlled machines or computers that walk and talk with the aid of electro-mechanical bodies. In the movies, however, robots began appearing by 1910—three decades before the invention of the electronic computer. The most sophisticated and memorable of the early "mechanical men" was the evil, *female* robot in 1926's "Metropolis." Since "Metropolis," automatons have been popular movie characters.

Robots have a dramatic edge over PCs. Computers are, after all, basically boxes with flickering displays. Robots, on the other hand, with electronically enhanced, human-like characteristics, have more dramatic possibilities. Those who have seen them cannot forget, for example, the gigantic Gort of "The Day the Earth Stood Still," the cute R2D2 and fussy C3P0 of the "Star Wars" saga, and the nearly unstoppable assassin of "Terminator."

Running amok. Until the relatively friendly Macintosh and Windows systems helped average people learn PCs, computers severely intimidated most people. Films reinforced fear of computers because, after all, scenes of cheerful users composing spreadsheets would be too boring to sell tickets. Since drama is fueled by adversity, when computers appeared, you knew computerized calamity lay just ahead.

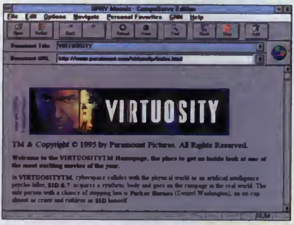
Widespread, computer-based paranoia started in the 1950s and was reflected in that decade's movies. The computer in "Gog" caused havoc after being sabotaged by enemy agents, and the machine in "The Invisible Boy" tried to rule the world before getting switched off. In the romantic comedy "Desk Set," Katherine Hepburn played the head of a newspaper reference library whose job seemed threatened by the acquisition of a computer programmed by Spencer Tracy.

While your PC may have frightened you when a critical file was lost or the hard drive crashed, the computer malfunctions in "2001: A Space Odyssey," "Dark Star," and "Westworld" were horrifically worse. In those films, computers went beyond data destruction and killed people. In most films of rampaging robots and cracked-up computers, the body count remained limited, though programming problems in "WarGames" threatened nuclear holocaust.



CREATE THE ULTIMATE GO WORD AND HACK YOUR WAY TO GREAT PRIZES!

A CompuServe "Hackers" game encouraged users to solve playful mysteries, but a "Hackers" Web page itself fell prey to real-life sabotage.



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Welcome to the VIRTUOSITYTM Homepage, the place to get an inside look at one of the most exciting movies of the year.

In VIRTUOSITYTM, cyberspace collides with the physical world as an artificial intelligence psycho-killer, SID 6.7 acquires a synthetic body and goes on the rampage in the real world. The only person with a chance of stopping him is Parker Barnes (Denzel Washington), an ex-cop almost as crazy and ruthless as SID himself.

Film promotions use Web pages to reach audiences comfortable both exploring cyberspace and watching films about it.

More perverse than accidental glitches were advanced computers that tasted the fruit of the Tree of Knowledge, became self-aware, and turned evil. Artificially intelligent computers in "Colossus: The Forbin Project," "Demon Seed," "Superman 3," and "Terminator" attempted to control or exterminate the human race.

Hacking computers. How much trouble can a kid and his computer cause? They can work plenty of evil, according to the movies, ranging from getting grounded by parents to causing global, thermonuclear war.

Teen-age geeks in "Weird Science" used their PC and a link to a secret government computer to create a woman who would be very difficult to explain to their parents.

In "Sneakers," "The Net," and "Hackers," the protagonists stumbled into cybercriminal conspiracies, got deeply into trouble, but managed to outwit the nefarious opponent.

In "WarGames," a high school student tapped into a Defense Department computer to play games, which were unfortunately taken as the real thing by the computer and nearly launched a nuclear strike.

Virtual spaces. Cinema was a forerunner of virtual reality (VR). In 1895, the first motion picture projector was patented, and at the first public movie showings, audience members were startled by the novelty. By 1927, when silent films were taken for granted, "talkies" added an extra dimension to the experience. In 1932, Technicolor added living color to the moving images. Although not interactive, films in darkened theaters gave audiences a visual and auditory "artificial reality" that let them temporarily forget about real life.

Computers took such fantasies a step further by giving viewers interactive control over explorations of artificial worlds. By the 1990s, the possibilities of VR and cyberspace became inescapable media themes. Cinema's first look at the new frontier was 1984's "Tron." In that fantasy, the protagonist was digitized and thrust among the electronic life forms inside a computer.

In the recent "Johnny Mnemonic," the endangered title character was a courier with an implant that let him download data into his brain, essentially letting Johnny carry cyberspace inside his head. This movie was based on a 1981 short story by William Gibson—the writer who coined the term "cyberspace" in his best-selling 1984 novel "Neuromancer."

In "Brainstorm" and "Strange Days," ultimate virtual reality became someone else's reality. Using computers that could record and play back thoughts and sensations, voyeurs relived parts of other people's lives—sometimes with the deadly results that seem obligatory in such flicks.

Where does *virtual* end and *reality* begin? In "Lawnmower Man," "Brainscan," and "Virtuosity," simulations turned lethal when virtual reality became *too* real and escaped into the outside world.

Movies *Inside* Computers

Tie-ins. Innumerable movie-related images and information nuggets exist on the Internet and commercial services.

"Hackers," for example, was a cinematic peek into the anarchistic, countercultural life of hackers surfing the phone wires in relentless pursuit of information. "Hackers" also became a real-life, multimedia event on America Online (AOL), CompuServe, and the Internet when the film was released. AOL featured movie reviews, live forums with the filmmakers, chat rooms for AOL members to discuss various movie topics, and downloadable pictures and film clips.

Meanwhile, rival CompuServe had a "Hackers" contest involving a "hacking" game. Weekly clues were given for six weeks, and the contest's solution provided the password to a secret area on CompuServe containing prizes.

On the Internet, MGM's World Wide Web page promoting "Hackers" got hacked itself. A group calling itself "The Internet Liberation Front" rewrote the page, giving "Hackers" a thumbs-down and inserting a laudatory link to Columbia Pictures' competing site for "The Net."

Although advertising in cyberspace has pitfalls, its popularity is growing. Movie ads and posters, in addition to stylized art and tag lines, now sport Internet addresses of movie home pages. The most extreme example was the full-page ad in *The New York Times* for the movie "12." Other than a tiny Universal logo at the bottom, the ad contained only enigmatic artwork and an Internet address in large letters.

The home page for "Virtuosity" included a clever, promotional, interactive, online game based on the movie. The viewer/player got to match wits with the digitized devilishness of SID 6.7, the movie's villain.

Online and on CD-ROM, you can spend free time scanning movie reviews, film clips, film promotions, screen savers, and Hollywood news. Online you can order movie posters, video cassettes, books, and memorabilia.

Downloading movie-related images is very popular among online service users. You can acquire images of movie scenes, scenes that were cut from the finished film, behind-the-scenes production shots, and images of movie stars.

Aspiring actors and actresses can find out about auditions and post resumes and photos in AOL's Casting Forum. When aspiring actors become established movie stars, they can have their own Web pages.

Games. The film industry, in terms of dollars, lags behind the $7 billion computer/video game industry at $5 billion. Computer games have grown from simple text adventures and shoot-'em-ups to sophisticated, movie-like experiences with clips filmed on Hollywood-style sets and three-dimensional animations.

The "interactive movie" games have developed their own genre. Players watch a video clip or computer animation, make a choose-your-own-adventure-style choice, then fight/fly/flee to the next clip.

To help give games a big-screen feel, game creators add images, voices, and video clips of celebrity casts to their creations. Margot Kidder and Brian Keith starred in *Under a Killing Moon*, Malcom McDowell and Mark Hamill headlined *Wing Commander III*, and Dennis Hopper and Stephanie Seymour performed in *Hell: A Cyberpunk Thriller*.

Celebrities aren't alone in the cinema/computer crossover. Popular action movies often are translated to computer screens, and game graphics are beginning to rival those of the big screen. When Nintendo asked Britain's RARE Ltd. to create the game version of the James Bond film "Goldeneye," RARE used the same computer technology that produced "Jurassic Park."

The film/game crossover sometimes also works in reverse. Computer games such as *Super Mario Brothers*, *Street Fighter*, and *Mortal Kombat* have been re-created as motion pictures.

Movies *By* Computers

Digital special effects. Special effects let movie directors tell any story they can

Cybercinema Top 10

Hollywood's best movies with computers as a central theme are listed here in ascending order. Find the flicks in a video store, make some popcorn, and enjoy some cyberculture entertainment.

Tron (1982)

10

This represents the first fanciful look inside cyberspace. A computer jock is digitized and trapped inside a computer, where he must survive among the electronic life forms inhabiting the microchips

Brainstorm (1983)

9

After researchers discover how to record and play back a person's thoughts through a souped-up VR helmet, one scientist records her after-death mental images as she dies from a heart attack.

Weird Science (1985)

8

In this comedic spoof two nerds using a home computer and a government phone link create, like digital Frankensteins, a mysterious, stunning cyberwoman.

Virtuosity (1995)

7

SID 6.7, a serial-killer simulation program, comes to life as a nearly invincible robot and begins a spree of violence. Only the former cop who battled the killer in VR can stop him in real life.

The Net (1995)

6

After a computer consultant stumbles upon a criminal plot, she finds her life threatened and her identity disappearing. Computers become her greatest threat and her only hope.

imagine. From "Star Wars" to "E.T." to "Jurassic Park," eight of history's 10 highest-grossing movies relied heavily on effects. These visual tricks can make something unreal look real (as in "Jurassic Park") or make something unreal look funny (as in "The Mask").

In the early days of filmmaking, special effects were performed with manual camera tricks and scale models. Now computer-generated imaging (CGI) is becoming the premier maker of special effects. George Lucas's Industrial Light and Magic (ILM) became an industry leader in special effects when Lucas started it to create the effects for "Star Wars" in 1977. In this groundbreaking classic, computer-controlled cameras filmed scale-model spaceships twisting and diving in space battles.

Effects are increasingly shifting from scale models to pure digital images. Walt Disney's "Tron" was the first feature film to use computer-generated graphics extensively. It contained more than 15 minutes of fully computer-animated shots plus another 25 minutes of computer animation composited with live action. Digital effects now can be found in motion pictures, TV shows, commercials, and business videos. Digital studio business is growing at an estimated 25% to 50% a year.

In addition to making effects more spectacular, computers also make them more affordable. Effects that would be prohibitively expensive using traditional methods can be done via digital effects. Computers may save Hollywood from soaring production costs, for example, by breaking the stranglehold unions have had over production sets. Instead of needing a team of carpenters, electricians, and others to build sets, entire scenes can be synthesized and composited with live-action shots of actors playing against a blue screen. On film, the blue screen is electronically replaced by the computer graphics. Some sets were created this way for "Star Gate," "Interview with the Vampire," and "Mortal Kombat."

If computers can generate sets and rampaging dinosaurs, computer-generated actors (or re-creations of late stars) someday may replace expensive movie stars and their multimillion-dollar salaries. Computerized actors have already played bit parts. "Judge Dredd" used computer-generated actors in its motorcycle chase scenes.

Digital effects aren't limited to science-fiction films. In "Forrest Gump," Tom Hanks shook hands with John F. Kennedy through digital compositing. Extras surrounding a presidential motorcade in "In the Line of Fire" were digitally multiplied into a huge crowd. When Brandon Lee died during shooting of "The Crow," the film was salvaged by pasting digitized images of the actor into unfinished scenes.

Even the plot of "Rising Sun" hinged on digital effects, though it was the characters, not off-camera techies, working with them. In that film, a murder was pinned on an innocent person through alteration of security camera videotape. The mystery was solved by digitally recovering what the tape had originally recorded.

Special effects that cost millions to develop, such as **morphing** (seamless changing of one image to another) used so memorably for the liquid-metal robot in "Terminator 2: Judgment Day," now are downsized for your

Video List

Sneakers (1992)

5

A former hacker with an assumed identity as a security consultant is forced to steal the ultimate code-breaker that can decipher any secret.

Terminator (1984)

4

SkyNet, an American, computerized missile defense system, acquires self-awareness and decides humanity is the enemy. After incinerating much of the world with its arsenal, SkyNet builds killer robots and a time machine to exterminate the survivors. In the 1991 sequel *Terminator 2*, however, the heroes reprogram the future.

Colossus: The Forbin Project (1969)

3

Fears of computers "taking over" were epitomized in this bleak but fascinating look at a supercomputer constructed to control the nation's defense system. (See "Terminator.") After being given command of America's missiles, Colossus develops self-awareness and ambitions to rule the world.

WarGames (1983)

2

A hacker in search of a great computer game accesses a defense computer, plays the global thermonuclear war game, and nearly launches World War III.

2001: A Space Odyssey (1968)

1

In a spacecraft heading toward Jupiter, HAL, the melodiously voiced computer, suffers a digital breakdown and kills most of the crew before being shut down. In the 1984 sequel "2010," the reactivated HAL attains computing immortality.

PC. You can scan family photos into your PC and then make Mom morph into Dad and Whiskers into Spot.

Photo-realistic images large enough to plaster across the silver screen, however, require massive computer muscle such as the computers manufactured by Silicon Graphics. The company started making image-processing computers for scientists and engineers in the mid-1980s and now does so for movie producers. In the days before government budget cuts and the end of the cold war, NASA or the Pentagon would incite computer innovations. Now Hollywood does it.

Digital processing. We expect to see computers used in the production of science fiction movies, but computers also are used in surprising ways with "old movies."

We've all seen colorized versions of old, black-and-white classics. The color is added, not chemically to film prints, but electronically to videotapes for distribution via broadcasts or videocassettes. Although some critics protest colorization as contrary to the artistic intent of the original filmmakers, it appeals to a large audience. Moreover, colorization is the only hope for restoring original color values to films that have deteriorated.

Digital restoration was part of the rerelease of 1933's "Snow White and the Seven Dwarfs." A Kodak crew digitally copied each of the 114,500 animation frames in the Disney film, used computer tools to correct numerous defects (such as dust, scratches, and faded colors) that had crept into the film stock, and generated a fresh film print from the digital file.

Digital restoration will be even more important in the future because digital bits, unlike fragile film, are forever. The nation's movies are decaying, and we're not referring to loose morals and bad scripts. The physical film stock itself is a poor medium for long-term storage. With age, celluloid becomes brittle, and its colors fade. Only a small percentage of films shot before 1910 still exist, and even films from as late as the 1980s have begun to fade.

In the past, preserving a movie before the film stock went bad required making a copy of it. Since copies were never as good as originals, however, film quality was lost.

Michael Friend, director of the film archives at the Academy of Motion Picture Arts and Sciences, sees computers as a kind of cybercinema savior. If the images are stored digitally, the images can be copied forever without degradation of quality. Digitizing a feature-length film with image resolution equivalent to 35-millimeter film, however, would require the storage equivalent of more than 5 million diskettes.

Digital restoration will be even more important in the future because digital bits, unlike fragile film, are forever.

Document Title: A Sandra Bullock Web page

A Sandra Bullock Page

Fan clubs have adjusted to the Information Age with star-based Web pages.

The enormous storage requirements of digital video explain why files consuming multiple megabytes still run as short, jerky, grainy, quarter-screen videos. To achieve film-like resolution, a short clip could consume your entire hard drive. Therefore, many compromises are made in sampling and compressing images.

Present computer video is still in its infancy and perhaps is the technological equivalent of the black-and-white, silent films of the 1920s. Improved future technologies of scanning, compression, and storage should solve computer video problems. In the future, in fact, all movies may become digital.

Making your own movies. If you ever tire of *watching* movies, software pioneered by Hollywood and downsized for PCs lets you produce your own small-screen movies. Software and accessories for home video titling and editing now are available for PCs that rival the power of broadcast studio equipment.

Computer animation has become so easy that, literally, even a child can do it. Several software packages exist that let children too young to read create working animated cartoons. Adults needing graphics for business presentations once made simple overheads or slides. Now they can make multimedia computer productions combining text, graphics, animations, sound effects, and film clips.

Future Of Flicks

The "holodeck" of "Star Trek: Generations" represents perhaps the ultimate cybercinema goal of fully interactive, fully convincing artificial reality. The holodeck's programs used holograms and shaped force fields to generate hyperrealistic, touchable images that were indistinguishable from real objects. Our present technology seems far from holodecks, yet researchers at MIT's Media Lab are working on real-time, three-dimensional holographic displays that don't require clumsy goggles or helmets.

Certain caveats about predicting cybercinema's future can be found in its past. In the 1950s, 3-D was supposed to revolutionize movies, but it withered into a grade-B gimmick. On the other hand, before introducing the original PC in 1981, some folks at IBM pessimistically projected only 100,000 personal computers would *ever* sell—but for a decade and a half, comparable numbers have sold *weekly*.

Crystal balls are anything but crystal clear. Yet, with movies going digital and computers becoming more cinematic, the Siliwood convergence should only continue. ●

by Mark D. Stucky

SPECIAL REPRINT

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Guide to Windows 95

Name That Tone

How Computers Produce Sound

The speakers are set, the volume is cranked, and after anxiously tearing open the collector's version of *Tie Fighter*, you pop the CD-ROM into your drive and start the game. The tension mounts as you feverishly zip through the installation process—and then the moment arrives. The credits roll, and the music . . . the music . . . the music never comes! Silence reigns as the story line scrolls to the top of the screen. The game must wait until the sound is willing to cooperate.

Music soothes the soul, and the sounds around us are a large part of our environment, both for work and play. The technology that gives our computers sounds beyond the occasional beep and the annoying whir of the hard drive is still pretty new, but in the short time since its implementation, the quality of sound reproduction has improved dramatically and the demand for it has grown exponentially. With a sound system of some form being an essential part of any PC, users should know about the system's components. Here's a summary of all the pieces and parts under the hood that will help bring a little song to you.

Each computer has minimal sound capability. The very basic model may produce only the occasional beep, but it is generating its own sound. The **sound card** is an **expansion card** that records and plays back sound to enhance the machine's existing capabilities. (An expansion card is an electronic circuit card that fits into a slot on the main circuit board inside the computer.) Sound cards usually come preinstalled with many of the PC packages on the market today, but if your computer doesn't have one, they're fairly easy to find.

Before you run out to the electronics store, however, stop for a moment and consider your needs. Not all systems require the use of a sound card. If your system's primary function will be financial applications or word processing and you don't enjoy entertainment packages, the occasional beep probably will be plenty. If you're a music or entertainment enthusiast, though, you probably should invest in a sound card and any additional equipment, such as speakers, equalizers, and MIDI instruments, to bring the system up to the desired noise level. Applications involving the reproduction of musical sound, games, presentations involving speech, interactive movies, and some research materials all use sound as part of their function. Without a sound card, you'll be able to use some of these programs without hearing what is on them, but you may not be getting the full range of benefits from them.

If you decide to add sound to your PC, you should understand how a sound card works so you can determine which type of card will best suit your needs. Bit numbers appear on every sound card package, but what do they mean? **Bit** is short for binary digit, and these digits make up the code the computer reads. In the case of a sound card, the code represents a sound. A computer's language, or code, is based on the **binary system**, which means it's based on a complex set of circuits that are either on or off. One stands for on, zero stands for off. The number reading either one or zero is the **binary digit**. The conversion of a sound into a binary code is called **digitizing**, which is simply the process by which the computer translates a sound into the language it can understand. The end result, a sound the computer reads as a series of ones and zeros, is called **digital audio**.

The numbers 8-bit and 16-bit are found on most cards on the market. The **bit number** refers to the size of the storage space the sound resides in. Imagine that your sound is broken down into pixels the way your computer monitor is. The larger the pixel, the rougher and more grainy the picture. The breakup of your sound into 8-bit and 16-bit works much the same way. The **sampled** sound is broken up and stored in little "boxes,"or bits, and the size of the box determines the size of the pieces that must be put together to reconstruct your sound. (Sampling occurs when a sound's frequency is marked at various stages. The sampling information is used to re-create the sound.) The higher the number, the sharper and clearer the sound.

Sound Production

After looking at how computers store sound, it would be helpful to know what computers put into these storage spaces and how sound is produced. Computers use two methods to produce sound: digital audio and synthesis.

Like a child first learning to speak, the computer must hear a sound, dissect it, and file it in a way the PC understands. The computer translates all of its information into and out of binary code. In order to translate a sound into binary code, the system must break a sound down into a numerical form. Your computer begins the translation with a process called sampling, which, as we've already noted, is the method used to test the frequency of the sound wave. The frequency number recorded is what the system uses to reproduce a particular sound. The **sampling rate** (the interval at which the sound is sampled) must be at least twice the **analog frequency** (the frequency at which the sound is heard by the human ear). After the sound has been sampled, it is then digitized, or translated into binary code. The sound is given a number that will be read and played back at a later time.

The frequency at which a sound is sampled is measured in **kilohertz (KHz)**, or a thousand times per second. If a sound wave is sampled at 1KHz, it means that wave is being measured 1,000 times per second. Sound cards sample at rates of 11.025KHz, 22.05KHz, and 44.1KHz. The most important fact to remember is that the higher the KHz number, the more times the wave is being measured per second, the more times the wave is being measured overall, and the more accurate the reproduction, resulting in a sharper, truer sound. By sampling, the computer can "record" a sound almost like a sound. This computerized recording is called **digital audio**.

Computers use two methods to produce sound: Digital audio and synthesis.

Synthesis is the process by which the computer creates an audible sound. The quality of that sound is dependent upon the music-producing mechanism, the synthesizer. There are two types of computerized music synthesis: **FM synthesis** and **wavetable synthesis**. In order to create music above the most simplistic level, the synthesizer needs to be able to play more than one instrument at a time. This capability is called **polyphony**. An example of polyphony is the Creative Labs AWE 32 Sound Card or SoundBlaster 32. These cards have created some confusion because buyers see the number 32 and think the number represents bits, but even though the 32-bit audio card may be in the works, it is not on the market yet. The number 32 on the cards refers to the number of instruments the card is capable of playing at one time.

FM synthesis does not use digital audio; instead, it uses a set of complex algorithms to construct a sound. In a way, it uses its own voice to mimic instruments, not a digitized recording. FM synthesis has been used to substitute various instruments, but because the sound is created simply from a mathematical equation, the difference between a piano and a guitar, for example, is sometimes hard to hear. The process allows a great deal of manipulative control but doesn't produce a very realistic musical sound. This wouldn't be the production system of choice for people who are interested in using their systems to produce music or for anyone who wants to listen to a variety of material. Creating your own orchestra would require the use of wavetable synthesis.

Wavetable synthesis uses digital audio, the recordings of actual sounds from various instruments. Because wavetable synthesis uses recordings like a tape recorder, the quality of sounds produced is dramatically improved over FM synthesis. When you play the wavetable sounds of a piano, you're hearing the reproduction of actual piano sounds that have been recorded and played back. To conserve as much memory as possible, only a few sounds are recorded for each particular instrument, and the pitch is then electronically manipulated to produce different pitches and dynamics. On a rather crude level, this works much the same way that playing a 33-speed record at 45 speed makes Frank Sinatra sound like one of the Chipmunks. The pitch, timbre, and dynamics are manipulated in a much more complex manner to produce an accurate reproduction of each instrument's individual sound. With wavetable synthesis, you're unlikely to mistake a piano for an organ or a banjo for a guitar. Most sound cards currently on the market use wavetable synthesis or a combination of wavetable and FM synthesis.

The sound quality and clarity differences between FM synthesis and wavetable synthesis are extreme. For someone who wants to use musical applications or applications with a heavy emphasis on music and reproductive sounds as part of the "atmosphere," such as many of the games on the market, wavetable synthesis is the only way to go

MIDI files serve as a set of instructions for the computer to produce, or synthesize, the sound. (MIDI stands for Musical Instrument Digital Interface.) The whole process works much the same way a music box creates sound. Music boxes activate the notes to be played by manipulating a cylinder covered in raised bumps. These little bumps look like an uncomfortable case of chicken pox, but when read by the combs of the music-producing mechanism, they come together into an actual song. The bumps, or MIDI files, provide the instructions, but the quality of the resulting sound is dependent upon the synthesizer.

Sounds recorded on wavetable synthesis can be manipulated and played back through a MIDI instrument. To play a musical instrument on the PC, you must plug in a MIDI instrument. It's possible to play a variety of instruments from a MIDI keyboard, a slightly smaller version of a regular piano keyboard, by selecting a different instrument from the interface. Using the piano keyboard, you can reproduce the sounds of a saxophone, drum, or a tuba with the touch of a button. The sounds you're receiving from your speaker(s) may not match the actual instrument, but it gives you a reference medium to play notes from. The MIDI instrument is essential for playing music. Eddie Toro, product manager for Creative Labs says, "There is software that will let you use the mouse on a keyboard on the screen to actuate the notes as well." Tapping out a tune note for note with a mouse may take some time, however, so for ease and speed, the MIDI keyboard is still the preferred instrument. The MIDI interface also can be used for FM synthesis, but the sound won't be instrument-quality.

Things To Consider

There are three sound card standards: SoundBlaster, Ad Lib, and Windows. SoundBlaster, by Creative Labs, is by far the leader of the group and is generally accepted as the safest type of card to purchase. When looking for a card, keep your needs in mind. What kind of sounds will you be using? Speech- or music-oriented? If you're going to be using any musical applications, investing in the wavetable card would be wise.

Another aspect to consider is the sound quality; do you need 8-bit or 16-bit? The most important quality, though, is compatibility. Look around at some of the applications you want to use. Do you need SoundBlaster? Do you need MIDI? If you already have a sound card that isn't filling all your needs, you can purchase daughterboards or expansion cards that attach themselves to your current sound card for upgrading or adding MIDI compatibility.

Understanding the basics of your PC sound system may help you put a label on your needs and give you some ideas to take to the store, but it's probably going to take a screwdriver, a little luck, and another issue of *PC Novice* to get the Star Wars theme rolling out of your speakers. The saga continues . . . ●

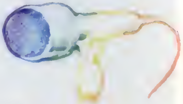
by Elizabeth Panska

What To Look For In A Sound Card

There are several sound cards on the market, and sifting through them to find the one to suit your needs can be a guessing game. To help you muddle through, here are some of the elements to look for in a sound card in order to perform various functions.

Business Applications
(i.e., *MS Word*)
An additional sound card isn't necessary.

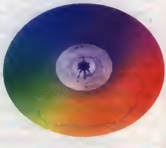
Playing Music CDs
16-bit audio



Speech/Voice Reproduction
16-bit audio
Wavetable synthesis

Playing Games
16-bit audio
Wavetable synthesis

Music Production
16-bit audio
Wavetable synthesis
MIDI



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A Look At Hard Drives

The memory is a wonderful thing. Not only does our memory let us recall past experiences such as family vacations and birthdays, but we are also able to remember vital information such as where we live, our phone numbers, and how to balance a checkbook. In fact, without the ability to remember the information we acquire each day, life would be totally unproductive. Memory lets us store the information we acquire today so that we are better prepared to face the challenges of tomorrow.

Memory is an absolute necessity to a computer as well. Each computer usually contains a variety of memory storage realms, including a **hard drive**, which is the primary storage device for a computer system. Despite the necessary functions performed by the hard drive, many computer users may be unfamiliar with it. Often the only signal that alerts a user to the hard drive's existence is a tiny light on the computer that blinks whenever the hard drive is in use. However, the average hard drive provides your computer with the equivalent storage space of a small library.

■ Memory vs. Storage

When information is entered into a computer, it's carried throughout the PC as a **binary language**. The computer's binary language is based on two binary digits, or **bits**, a 1 and a 0. A **bit** is the smallest element of the binary "alphabet." The combination of eight bits is known as a **byte**. Each byte represents one character of information, such as one letter of the alphabet, a number 0 through 9, or punctuation. In a matter of milliseconds, a series of bytes reaches the **motherboard**, the primary circuit board of the computer that links together all the other components within the computer. At the heart of the motherboard is the **microprocessor**, a silicon chip that contains all the central processing functions of a computer. The microprocessor determines where the information needs to go.

Much of the information processed by the microprocessor needs to be saved. The microprocessor may choose from a few options. Any program that you are actively using is copied and saved in the computer's main memory space, known as **random-access memory**, or **RAM**. All information stored in RAM, however, is deleted once the computer is turned off. Because RAM is temporary, it's an inefficient and impractical storage medium for programs that need to be referred to often. In this case, the microprocessor wouldn't save the data in the computer's memory but would place it into storage. Unlike memory, which is data temporarily posted in the computer's mind, storage is the computer's way of putting something in writing and then filing it in a cabinet.

If a relatively small amount of information, such as a single report or a spreadsheet, needs to be saved permanently, the information can be stored on a diskette. A **diskette** is a polyester disk coated with magnetic oxide and enclosed in a plastic jacket. Each diskette usually holds 1.44 or 2.88 **megabytes (MB)** of data. (One megabyte is equal to about one million bytes, or characters, of information.) Information is stored on and retrieved from the diskettes by a mechanism called the **diskette drive**, which is a thin slot located on the front panel of your computer. There are many advantages to using diskettes. The primary advantage is that they are removable and portable so that information can be transferred easily from one computer to another. Another advantage is the low price of diskettes. A single diskette usually costs about $1.

When information is saved on a hard disk, it's stored in a cluster.

If a large amount of information needs to be stored permanently, however, the data will be saved onto a hard disk within the hard drive. A **hard disk** is a rigid aluminum disk with a magnetic oxide coating, similar to the diskette. In fact, the hard disk could be considered the bigger, faster, and stronger brother of the diskette. Unlike the diskette, which is a small-capacity, portable storage medium, the hard disk is a large-capacity storage device, currently capable of storing as many as nine **gigabytes (GB)**. (A gigabyte is equal to a billion bytes, or characters, of information.) These hard disks (most computers have two or more) are encased in a small plastic box within the computer. This is known as the hard drive. The **hard drive** records new information onto the hard disks, then retrieves it for later use. This is where often-used programs, such as *WordPerfect* and Windows, are stored.

Without a hard drive, many programs would be impractical to use because you would have to reprogram the computer each time you used it. Millie Nygren, a senior technical support engineer for Quantum, explains the necessity of the hard drive. "Since programs require more storage space than a diskette is capable of handling, a hard drive is necessary to store these programs on your computer."

There are many types of hard drives on the market, each designed for computer users with various needs. Quantum, Seagate, Maxtor, Conner Peripherals, and Micropolis are just a few of the hard drive manufacturers. Understanding how the hard drive works will let you decide which hard drive will best suit your needs.

■ How Does It Work?

The hard drive consists of a number of hard disks, or platters, that are mounted on a rotating spindle. Each platter has its own read/write head, which records information on the disk (writes), then retrieves it for later use (reads). These heads, which float about 1/100,000 of an inch above the surface of the disk, are miniature versions of the record/playback heads found in audio cassette recorders. Each of the read/write head extends out over its platter on an **actuator arm**, which allows the head to be moved across the platter.

When information, in the form of binary language, is passing through the microprocessor, it moves through a series of transistors. These transistors serve as on/off switches that control the flow of electrical currents. The data then proceeds through a system of tiny wires until it reaches the hard drive. Once inside the hard drive, the currents pass through the read/write heads where they are emitted in a series of electrical signals. These signals correspond to the binary language. A one corresponds to the presence of an electrical signal (on), while a zero corresponds to the absence of this signal (off). The magnetic surface of the hard disk then attracts the electrical signals emitted from the read/write head and holds them to the disk's surface.

The data is recorded into sectors and tracks on the disk's surface. Circling the disk is a series of **tracks**, similar to the grooves on a record album. These tracks are divided into **sectors**, each of which can contain 512 bytes of data. In hard drives that contain more than one disk, the collection of identically numbered tracks from each disk forms a **cylinder**. Data is recorded onto individual sectors beginning with those sectors that make up the outermost cylinder of the hard drive. Those programs used most often are recorded on the outer cylinders for easiest access. As programs are recorded onto cylinders in the hard drive, they are simultaneously recorded in a directory that keeps track of the information stored on the hard disks.

■ Directories Of Information

When information is saved on a hard disk, it's stored in a number of conjoined sectors, known as a **cluster**. Files don't necessarily have to be stored in consecutive clusters, however. In order to keep track of files and other information that pertains to the hard

Hard drives are composed of disks that are read by a moving actuator arm.

drive only, hard disks undergo both **high-level** and **low-level formatting** programs before they are ready for use.

During low-level formatting, which is usually done by the manufacturer or the retailer, the sectors and tracks are laid out on the surface of the hard disks. High-level formatting, on the other hand, is conducted by the **operating system**, or **OS**, that prepares a hard disk for use. (The OS is the software responsible for organizing the internal activity of your computer. DOS, OS/2, and Unix are a few of the most well-known examples of computer operating systems.) During this high-level formatting, the boot sector, filing system, and the root directory are established on a hard disk.

A **boot sector** is the special sector on the hard disk that is used by the computer to start the process of loading the operating system into RAM. This process occurs automatically every time a computer is turned on or reset and may take as long as a minute or two, depending on how many programs are stored on your hard drive.

The **filing system** organizes, names, and stores a directory of all the clusters on the hard disk as well as the location of each cluster. Some of the most popular filing systems include the file allocation table (FAT), which is associated with DOS, and the high performance file system (HPFS) and Super-FAT (a compatible version of FAT), both of which are associated with OS/2. Regardless of which file system your hard drive uses, it's a vital constituent of your hard disk storage. If the file system is destroyed, the hard disk is useless.

The **root directory** is the directory from which all other directories branch. Most computer systems, including DOS and OS/2, use a hierarchical filing system. According to such a system, the root directory is the beginning, or central, directory of the hard drive. A root directory for your hard drive might include WordPerfect, Windows, Lotus, and a few games. All other directories, such as lists of reports, spreadsheets, and data sheets, would be subdirectories.

The Improving Hard Drive World

As you acquire more programs and your directory gets bigger, you use more storage space on your hard drive. Older computers, especially those that are more than two or three years old, may have hard drives that hold only between 40MB and 80MB of information. While this may have been sufficient for PC use a year ago, the expanding capabilities of computers, especially concerning audio and video advancements, have rendered these old drives practically obsolete. Considering that a current version of WordPerfect requires 10MB of storage space in the hard drive and Windows can use as much as 40MB of storage space, it's easy to see how these older hard drives are quickly becoming outdated.

Fortunately, advancements in hard drive technology over the last two years have been able to keep up with the advancements in other areas of computer engineering. The average capacity of a 1994 hard drive was 200MB; in 1995, the average capacity was 400MB. Quantum, Seagate, and Conner Peripherals now market hard drives with storage space that exceeds 4GB.

Speed. What has caused this boom in hard drive performance? One cause is a faster rotational speed. A few years ago, a disk that could spin at 3,000 rpm was exceptional.

Today, disks spins at speeds around 5,000 rpm.

Rotational speeds improved drastically with the replacement of the stepper motor with a voice-coil motor. In older computers, a **stepper motor** moved the read/write head along the disk surface in a series of discrete steps. The new **voice-coil motors**, however,

Upgrading Your

If you've purchased a computer within the past few months, it's likely that you have not yet thought about improving the capabilities of your hard drive. However, if you purchased your computer more than a year ago or if you find yourself using your computer in more ways than you had originally planned, you probably have already realized how quickly the storage space on a hard drive is filled to capacity.

The quickest solution for maximizing storage space on your hard drive is to use a compression program, which eliminates the unnecessary and redundant information from your hard disks. Some programs, such as DOS 6.0, come pre-equipped with a built-in compression program. While this simple procedure can double the available storage space on your hard drive, compression may increase the amount of time you must wait for your hard drive to process data, and some computers experience problems reading compressed information.

But what if the data on your hard drive is already compressed, or you realize that compression only will be a short-term solution? There are two main options you can use when considering an upgrade on your hard drive. One is an internal replacement of the hard drive, which may involve actually removing your current hard drive so that a bigger, faster hard drive may take its place. The second option is an external addition.

If you decide to use an external hard drive, you must consider your computer's ability to handle peripherals. A **peripheral** is any external computer component that enhances the capabilities of your computer. A peripheral connects to your computer through an **expansion slot**, which is a vertical slot located on the back panel of your computer. Removing the protective plastic covers of these expansion slots provides direct access to an expansion bus. A **bus** is the electronic pathway along which signals are sent from one part of the computer to another. The **expansion bus** lets information travel between the peripheral (in this case, an external hard drive) and the computer's microprocessor.

If your computer provides you with enough expansion slots to add a peripheral, you then must determine the interface you will use to connect the peripheral to the computer. An **interface** is the point where a connection is made between two hardware devices, such as aren't limited in their movement by a series of predetermined increments. Instead, the voice-coil motor spins smoothly, without the slightest interruption needed to account for the steps.

Use of the voice-coil motor also has improved the average seek time. **Average seek time**, usually given in milliseconds (ms), measures the amount of time required to move a hard disk's read/write head to a particular location. The clumsy method of the stepper motor accounted for average seek times of nearly 120ms. But because the voice-coil motor simply reacts to the "voice" of the magnetic data, the read/write head may move directly to the areas of stored data. The voice-coil motor allows the read/write head the freedom to move toward any spot on the disk where data is "speaking." The average seek times for hard drives currently on the market ranges from 8ms to 17ms, nearly 10 times faster than before.

Engineers also are exploring the use of glass or ceramic platters rather than the traditional aluminum. These glass platters are lighter, smoother, and stiffer than aluminum disks, letting them be spun at higher rates of speed. In addition, the glass platters require less energy to use and less time to reach maximum spin speed, two factors that are becoming increasingly important as laptop computers and energy-efficient PCs gain popularity.

Density. A second reason for the boom in hard drive performance is the increased density of data on each track. In older hard drives, each track contained the same number of sectors, although the tracks that are nearest to the center of the disk are shorter than the tracks on the outside edge. In order to compensate for this, the data on these inner tracks was more densely packed than the data on the outside tracks. According to Nygren of Quantum, however, engineers have taken advantage of the longer outside tracks by increasing the number of sectors on the outer tracks. This procedure, which is sometimes called **multiple zone recording**, lets hard drive manufacturers significantly increase storage space.

By compacting the data on each track and increasing the rotational speed, the information on the hard disk is fed to the read/write heads at a faster rate of speed. Increasing the speed at which the data feeds into the read/write heads increases the **data transfer rate**, which is the time it takes data to travel from the hard drive to the microprocessor. This elimination of wait time increases your productivity, letting you spend less time at the computer and more time making your own memories.

■ In Conclusion . . .

Hard drive technology has taken off, and the days of 40MB, 80MB, or 200MB hard drives are behind us. Some sources predict that a hard drive will be capable of holding one **terabyte (TB)** by the year 2000. (A terabyte is one trillion bytes.) As the storage capacities on these hard drives increase, the prices will continue to decrease proportionally, letting the average computer user use more sophisticated programs in the home and the office.

There is no single hard drive that can accommodate every computer user's needs. Which hard drive will best suit you depends on how you'll be using your computer in the future. A general rule of thumb for deciding what size of hard drive is best for you is to estimate how many megabytes you will need, double it, and then go for the next higher size.

Taking the time to find the best hard drive for your computing needs will let you take full advantage of your computer and eliminate your chances of running out of storage space for as long as possible. ●

by Jeff Dodd

Hard Drive

a computer and an external hard drive. The two most popular interfaces currently available are SCSI (pronounced "scuzzy") and IDE. **SCSI**, or **small computer system interface**, lets the user connect seven peripherals to one port, or expansion slot, in a process known as "daisy chaining." SCSI is a universal peripheral interface, which allows it to be used for nearly every peripheral connection. Also, SCSI currently offers better performance than other interfaces.

Other interfaces, however, such as **IDE**, or **integrated drive electronics interface**, offer alternative avenues that may prove to be more suitable for your computer needs. In fact, IDE is the dominant form of hard drive interface. Also known as the **AT Attachment interface**, or **ATA**, IDE integrates all the circuitry needed to operate a hard drive into the drive itself, eliminating the need for plugging additional circuit cards into the expansion bus. Because of this integration, IDE is cheaper to produce than SCSI.

Generally, internal upgrades are more common than external upgrades. Millie Nygren, a senior technical support engineer for Quantum, recommends internal drives since they "are more cost-effective. You do not need the outside box and circuitry."

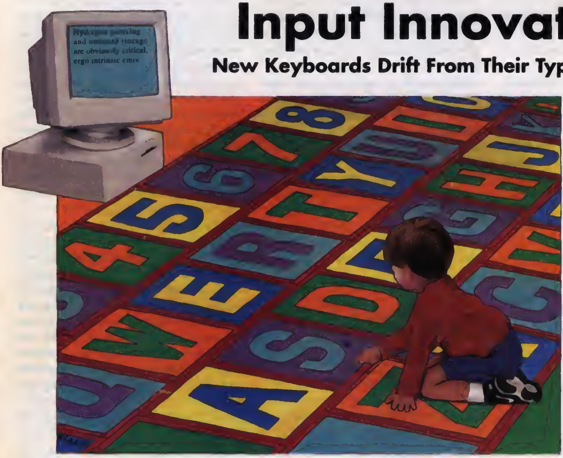
An internal upgrade can involve either the replacement of the old drive or the addition of an extra drive within your computer if there is room. Depending on your familiarity with your computer, this simple procedure may be completed in less than 30 minutes.

Once you've determined whether to go with an external or internal replacement drive, it's time to shop around. There are many hard drives on the market today, so finding the right one for your needs will take time. The most important points to consider when shopping for a hard drive are capacity, speed (both average seek time and data transfer rate), and price. A 500MB hard drive normally will cost between $500 and $790, while 1GB drives will range from $790 to $1,150. One way to compare price value is to calculate the price per megabyte.

Because most computer problems arise within the first few months of use, you also should consider the terms of the warranty. Most hard drive warranties are for one to five years, depending on the storage capacity of the drive. ○

Input Innovations

New Keyboards Drift From Their Typewriter Roots



It once was a sign of the times to hear the old rat-a-tat-tat of rapidly typing fingers in offices replaced by the quieter clicking of computer keyboards. But now even the PC keyboard, a novelty turned old standard, is competing with an explosion of innovative devices designed to make hours spent at the PC more comfortable and productive. The typical keyboard, modeled after typewriters and used for so many years, is being scrutinized more closely as the PC becomes a standard tool in both the workplace and home. In order to utilize new software, streamline the work area, and address ergonomic and family-use issues, peripheral designers have flooded the market with new, and sometimes odd, solutions.

■ Windows 95

The long-awaited arrival of Microsoft's new operating system was greeted with ready-to-go hardware and software complements. In addition to the software developed and modified specifically to take advantage of the new features available in Windows 95, a new brand of keyboard, manufactured by different companies but using a structure initiated by Microsoft, joined the consumer hunt. The keyboard features three specialty keys that provide quick access to the Start menu and the pop-up menu, Win95's primary navigation tools.

Though blessed with the golden label of being adapted specifically for Win95, the most popular innovation on the keyboard market is the addition of three keys that, in reality, perform functions that a small mouse movement would do just as nicely. Granted, keeping the hands on the keyboard does increase speed and productivity, but the degree of increase may not really warrant putting together a whole new keyboard.

Several top keyboard companies such as Microsoft and Mitsumi use the 104-key layout, which includes the three new keys. For example, Microsoft's Natural Keyboard, which features an ergonomic design, and Mitsumi's ZW 104 include the Win95 keys.

■ Ergonomic

A hot workplace topic is the need for a healthy and comfortable work environment. These concerns consider **ergonomics**, the science of determining proper relationships between people and machines, or, in other words, constructing devices for the comfort of humans. Innovations include chairs with improved back support for the many hours spent at desks, better lighting and glare guards to protect eyes that stare intently at monitors, and ergonomic keyboards.

Users who type at the PC for long periods of time have been advised to use **wrist rests** to prevent **carpal tunnel syndrome**, a potentially devastating, repetitive strain injury caused by improper positioning of the hands. The rests, narrow boards that lie in front of the keyboard, keep the wrists flat rather than bent at the joint. Keyboard designers have tried to go beyond the simplicity of the wrist rest to a more complete, comfortable hand-position standard.

The definition of "ergonomically correct" seems more open to creativity than the quickly standardized Win95 keyboard. An "ergonomic" keyboard can mean anything from a model featuring tilting positions to a complete reconstruction of what we're accustomed to seeing as a keyboard shape. **Traditional** keyboards keep the same key position (known as QWERTY because of the key arrangement on the upper-left side) found on a typewriter. **Split-traditional** keyboards take the traditional keyboard configuration, split the keys in half, and place them strategically for comfort. For example, Microsoft's Natural Keyboard has a small, pie-shaped split in the center of the keyboard, and the sections are rotated slightly outward for a more natural wrist position. The keyboard also is raised in the center and sloped outward to conform to the shape of the hands. Advanced ergonomic keyboards, such as the Kinesis Ergonomic Keyboard, completely redefine the look of a keyboard and key positions. Kinesis still uses a modified version of QWERTY, but the spacebar and BACKSPACE, CTRL, ALT, HOME, DELETE, END, PAGE UP, and PAGE DOWN keys all are located in position for the thumbs. The remaining the keys are nestled into wells in the sides of the keyboard.

■ Multimedia

Multimedia (which refers to the combination of sound, video, and text) remains a hot buzzword among the computer set, and many new systems come equipped with multimedia extras. Consumers who purchased their systems just a few years ago, however, may not have all the parts needed to take advantage of the latest software developments. Zealous keyboard manufacturers are developing products to ease the transition for users who want multimedia but who don't necessarily need the high quality of a kit that can produce theater-like sound.

Multimedia keyboards such as Maxi Switch's Maxi Sound include a variety of options, depending on the company and the amount you're willing to spend. Most, however, include these basics: speakers, a microphone plug-in, and a headphone plug-in. Additional features may include a built-in microphone, teleconferencing equipment, and expansion plug-ins for additional speakers or a subwoofer.

The obvious advantage to the multimedia keyboard is space. The sound quality on the Maxi Sound was good, though not overly impressive. You can hear music or game sounds on multimedia keyboards, and if you're happy with your transistor radio, you probably won't miss the extras of a full-fledged multimedia kit. If sound quality and volume are important to you, however, splurge for a true multimedia kit. The keyboard speakers don't produce the quality, and certainly not the volume, that the speakers in a kit provide.

■ Children's

Little hands are always eager to play, and there's no better toy than one Mom or Dad uses. Keyboard developers realized this and developed a diverse group of products for budding computer users. Like the ergonomic products, there really is no standard to the children's keyboard. The peripherals range from a more festive, multicolored version of the keyboard Mom and Dad pound away on to a product that hardly resembles the "adult" keyboard.

Products such as the Comfy Activity Center include software designed specifically for use with the specialized keyboard. Since the Comfy Activity Center replaces the regular alphanumeric keys with keys representing colors, shapes, and musical instruments, the accompanying software and the additional titles available are the only products that can be used with the keyboard.

Kidtech's My First Keyboard has the more familiar alphanumeric key system made spill-proof in a solid, virtually indestructible package accompanied by a pair of sample children's games. My First Keyboard has a port that lets users plug an "adult" keyboard in simultaneously and a switch for easily flipping back and forth between the two. Because the unit uses the alphanumeric design, you can use the keyboard to type, though it may be a little awkward because the keyboard isn't laid out in the QWERTY format. The board arranges the letters in two rows of 13 keys. My First Keyboard also includes a sample software package, but it may be used in other ways.

A typing instructor's nightmare: the Kinesis Ergonomic Keyboard (left) and the BAT Personal Keyboard.

SIIG's Cool Touch and Fun Touch keyboards are simply spill-proof, multicolored versions of an adult keyboard. In fact, they function just like ordinary keyboards and aren't packaged with any fun software. The only difference between the Cool Touch and the Fun Touch is the color scheme. In fact, the festive appearance is the only real difference between either of SIIG's keyboards and the standard keyboard.

■ Odd Options

In addition to the mainstream keyboard innovations, peripheral companies offer a wide array of interesting little gadgets in an attempt to begin the next wave in the sudden peripheral popularity contest. Here are a few of the more interesting innovations we've seen.

ITI, Integrated Technology USA Inc., developed a keyboard combination to enhance **telephony** systems. (Telephony generally refers to the integration of telephones and PCs.) The CompuPhone 2000 has modified the numeric keypad to toggle back and forth between its typical function and that of a telephone's button face. This setup might get confusing because the numbers start with 1 and move right and up, while on the telephone's face, the numbers run from 1 in the upper left-hand corner to 9 in the lower right-hand corner. If you're used to dialing without looking at the numbers, this may take some practice. A ringing keyboard might take a little getting used to as well. The package is rounded out with a telephone headset and a telephone management package.

The BAT Personal Keyboard from Infogrip takes oddity to a new level. To conserve desk space, Infogrip removed a few keys from the familiar board. In fact, the keyboard consists of only five keys that can be played as WordChords, or combinations of keys, much like playing a wind instrument for music. This tool was designed more for data entry than general typing speed. For users who still want to use the traditional QWERTY layout, there's the option of plugging that keyboard into the BAT and using both. The time and energy necessary to learn the BAT's alphanumeric key combinations and then program any additional macros you'll need for your own applications may not be worth the limited value promised.

Operating a TV or stereo from across the room might be helpful, but what about typing on the PC by remote control? Remote control comes to the PC with infrared keyboards that can be placed in virtually any position within 15 feet of the PC, as long as the keyboard has a direct line of sight with the PC. The best feature of the new infrared keyboards is freedom from restraint by the cord, but other practical aspects of this adapted technology are still a little vague. Unless you have Superman's vision, typing from 15 feet away will reduce your ability to see what you're typing and correct errors as you go, making any document a potential typographical playground. Keeping an eye out for a dwindling battery or stacks of paper or books coming between you and your keyboard receptor might be more trouble than just keeping the board near your PC.

If you're shopping for a keyboard, you clearly have a lot of options. Make a list of your needs before shopping, and test the various options in the store before purchasing to make sure the change is comfortable for *you*. At least with all the quirky innovations to try, your fingers won't get bored. ●

by Elizabeth Panska

For More Information:

Microsoft Natural Keyboard
$99.95
Microsoft
(800) 426-9400, (206) 882-8080

ZW 104 Keyboard
$34.95
Mitsumi
(800) MITSUMI, (214) 550-7300

Ergonomic Keyboard
$275
Kinesis
(800) 454-6374, (206) 402-8100

Maxi Sound
$89
Maxi Switch
(520) 746-9378

Comfy Activity Center
$129
Comfy
(800) 992-6639, (408) 865-1777

My First Keyboard
$79
Kidtech
(800) 367-7080, (609) 627-6800

Cool Touch and Fun Touch
$35 each
SIIG
(510) 657-8688, ext. 333

CompuPhone 2000
$139.95
Integrated Technology, Inc.
(800) 393-8889, (201) 907-0200

BAT Personal Keyboard
$199
Infogrip
(800) 397-0921, (805) 652-0770

What Are All Those Keys For?

While you're used to all the letters and numbers on a keyboard's alphanumeric keys, some of the extra keys may be an intriguing mystery. Instead of following the push-it-'til-it-does-something method, review key functions with this guide.

❒ Function Keys

Not just the F1, F2, etc., keys along the top of the keyboard, these keys perform specific functions in an application or operating system.

CTRL, ALT—Both the CTRL (which stands for Control) key and the ALT (Alternate) key function as amplifiers for other keys. Like SHIFT, these keys accomplish little by themselves, but they can perform valuable tasks when combined with another key. For example, holding down the ALT key and pressing the TAB key lets you switch among open applications in Windows 3.1.

ESC—The ESC (Escape) key whisks you out of your current application. Like PAUSE, it's a little temperamental and may not always perform the way you expect it to.

Function Keys—Particular software applications make their own uses of these keys. For example, most of the formatting and editing in early versions of *WordPerfect* can be performed using these keys.

HOME—Its function depends on the application. With some programs, it takes you to the top of a document. With many applications, it does nothing.

NUM LOCK—The NUM LOCK (Number Lock) key toggles the functions of the keys on the number pad between numbers and the cursor movement keys.

PAGE UP/DOWN—These keys are used in certain applications to move from screen to screen or from page to page.

PAUSE—PAUSE stops the action of an application and holds position until you're ready to continue. The key is a hit-and-miss element. Oddly enough, not all applications or games pause when this key is depressed.

PRINT SCREEN—Don't push this button and go stand by your printer; chances are nothing will happen. Contrary to its title, this key won't send a picture of what's on your screen directly to your printer with most programs. With Windows 3.1 and Windows 95, the key takes a "photo" of your current screen. In order to print the shot, you first must paste it from temporary storage in the Clipboard into a graphics application such as Paintbrush.

SCROLL LOCK—This key doesn't have an all-purpose application. Though some programs have a use for it, it's often just window dressing.

SHIFT—SHIFT serves several functions. It promotes letters to capital status and types those symbols above the numbers as it does on the typewriter. SHIFT also gives your function keys more functions.

❒ Movement Keys

Arrow Keys—The arrow keys move the cursor in the direction indicated on the key.

END—This moves the cursor to the end of a line.

TAB—This key functions for word processing as it would on a typewriter. TAB also is used in databases and similar applications to move from field to field. Pressing TAB alone moves the cursor one field forward, and pressing SHIFT and TAB at the same time moves the cursor backward. In Windows, pressing the ALT key with the TAB key moves you from application to application.

❒ Editing Keys

DELETE—This key deletes the character in front of it. Be careful when holding the DELETE key down, or lines of text will disappear in an instant.

INSERT—INSERT toggles between the Insert and Typeover modes. Most applications use Insert as the default setting. ○

How Much PC Do You Really Need?

Buying a PC is probably unlike any purchase you've ever made. Besides all the high-tech terminology, you've got other problems to face. Ordinarily when you make a big purchase or investment, you can use the product until it wears out, breaks down, or until you trade up. With a computer, however, your biggest worry is not the price (although that worries many of us plenty). For most users, it is probably obsolescence.

A few months after you make your purchase, a new microprocessor is introduced. Wait a few months longer, and your operating system is out-of-date. Wait a couple of years, and you may not have a machine that's powerful enough to run the majority of the new titles available. If you're into computer games, you know exactly what we mean. Computer games are graphic-, sound-, and video-intensive, and if you don't have the latest technology, you can't operate them at all.

So how much computer should you buy for your home office or business? Should you spend a wad on the most powerful, fastest system available? Should you keep waiting until the system you want drops in price, or will another, more powerful system catch your eye? Probably foremost on every computer shopper's mind is how much computer they really need, which we will help you answer. Along with telling you what kind of system you should buy right now, we'll leave you with buying tips, which should be helpful down the line when what's hot now has fallen to the wayside.

A Primo Processor?

One of the determinants of how powerful your computer will be, and probably how expensive it will be, is the **microprocessor**, also known as the **central processing unit**, or **CPU**. This microchip is the brain of your computer, handling the bulk of the processing going on inside. The most popular PC microprocessor currently is the **Pentium**. You'll see it on computer ads as a P75, P90, P100, P133, and so on.

The number following the P is the speed of the chip, referred to in **megahertz (MHz)**. One **hertz** is equal to one cycle per second, while 1MHz is equal to one million cycles per second. The higher the number, the faster the processor, and the higher the price.

Believe it or not, you don't have to buy the most powerful processor currently available to be happy with your system. Sure, it may be able to keep up with new programs being released months longer than an entry level system, but that may not be what you need.

At the beginning of 1996, the bare-bones, entry level system was a Pentium, operating at 75MHz, says Jack Phelps, vice president of operations West at CompUSA. (Don't even consider a 486, which is the processor that was popular prior to the Pentium.) For those price-conscious consumers, a 75MHz Pentium system running about $1,500 to $1,800 will be adequate for your typical home-office use, where you'll operate a few personal productivity applications, play a few games, and connect to the online world.

As the P75 drops in price, however, it is quickly being replaced by the 100MHz Pentium as the microprocessor of choice. If you can spare an extra couple hundred dollars, we recommend holding out for the 100MHz Pentium. We think it has the power to operate applications for homes or small businesses for several years to come. The system with a monitor should cost you anywhere from $2,000 to $2,500, and not only will it operate a little faster, it will keep up with the latest releases longer than the 75MHz machines.

Some of the new 133MHz Pentiums may catch your eye, but, Phelps says, a person with more money is a better candidate for that system, which will cost around $3,000. These systems are great for users who want really fast machines for business, multimedia, and games, and they probably will be the last to become obsolete. But most average computer users don't require that much speed. Rather, they should look to upgrade other areas of their system.

If you're holding out for the new P6 machines, which are the next generation of microprocessor (officially called the Pentium Pro), these systems aren't being incorporated in consumer systems yet, and most programs don't require that much processing power anyway. They won't reach a price range most people can afford for many months.

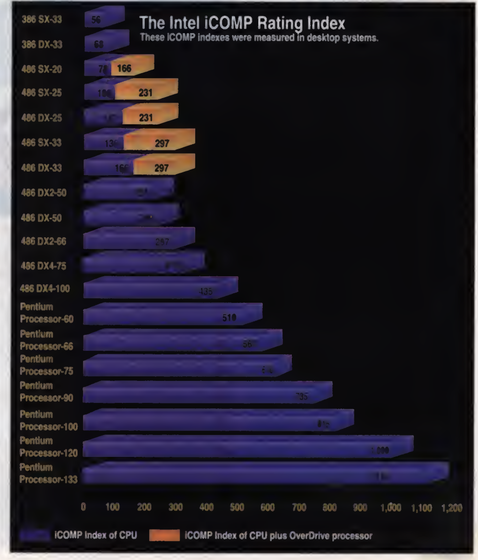
Don't Skimp On RAM

A computer's microprocessor isn't the only component you should consider. Thomas Jackson, PC technician trainer at Best Buy, says the microprocessor is only one portion of how you decide the speed of a computer. Other factors, such as how much **random-access memory**, or RAM, a computer has, are just as crucial. RAM is a kind of temporary memory where your computer places files and applications it is currently working with. RAM is a little like computer horsepower: The more RAM you have, the more quickly your computer will operate and the more powerful applications it can handle.

Currently, the minimum amount of RAM you should buy in a computer is eight **megabytes** (MB). (One megabyte is equal to about one million bytes, while one **byte** is equal to the amount of information required to form one alphanumeric character). In fact, you should buy 16MB of RAM if you can afford it. You may find 8MB works fine on a system with basic applications, but the more you use Windows 95, the more you'll want 16MB of RAM. You especially want a lot of RAM to do intensive graphical work, such as working with *Adobe Photoshop* picture files, or other programs that manipulate or edit graphics, Jackson says.

There are computer components you can skimp on to save money, but we found you shouldn't skimp on RAM. Gregg Frank, proprietor of a computer consultant business called User Friendly Computer Services in Neenah, Wis., says many problems he sees are RAM-associated; many applications are requiring more and more RAM to operate. Therefore, he recommends

Intel compares its own microprocessors according to a variety of actual working conditions in its iCOMP index. Here, you can see how the different microprocessors rate at their different megahertz speeds.



if you can't afford more than $2,000 for a computer, try a 75MHz system with 16MB of RAM. While it may take you a little longer to run your applications, you will be able to run the latest applications for a longer amount of time with the extra RAM.

Packing It In

We also believe you shouldn't skimp on the **hard drive**. This is the place where your computer permanently stores programs and files. Just like your closets at home, you will never have enough space.

While you still may find new computers with hard drives smaller than 800MB, look for systems with at least one **gigabyte** (**GB**, which is about one billion bytes) of storage. It shouldn't be difficult. Most 100MHz systems are now including 1.2GB to 1.8GB hard drives in the package. Right now, it may seem like a lot of space, but in a year or two, it's likely you'll run low on storage. Remember: Every program you add to your software library and every file you save on your computer will chew up some of that space.

Make It Multimedia

Most of those applications you find—be they personal finance, spreadsheets, educational, or entertainment—will include some sort of **multimedia**, which is the combination of video, sound, graphics, and text on your computer. In addition, many applications are available only on CD-ROM. Software manufacturers are taking advantage of the fact that they can store 600MB of information on compact discs and are including large sound and video files on their programs.

If you don't believe us, check out the software aisles. The popular personal finance program *Quicken* by Intuit is on CD-ROM, incorporating multimedia help and tutorial features. Broderbund's *Myst*, one of the most popular computer games, is available on CD-ROM. Even productivity programs such as *Microsoft Works* or *Peachtree Accounting for Windows* are available on CD-ROM. Consumers even are adding multimedia to their ordinary applications, Jackson says. For instance, you may click a cell in a spreadsheet to hear a sound or voice clip. And your computer can work as a great answering machine/system for a small business or home, but first you need a sound card to record your greeting and take your messages.

Preparing For MPC3

The Multimedia PC Working Group, which is a special interest group within the Software Publishers Association, has formed new guidelines for what multimedia computers should include. Although the MPC3 requirements have not become the standard as of yet, in the next few months you won't want to buy a computer that doesn't meet them. To keep up with multimedia programs coming out in 1996, you will want at least:

- ✓ 75MHz Pentium
- ✓ 8MB RAM
- ✓ 540MB hard drive
- ✓ 4X CD-ROM drive
- ✓ 16-bit, wavetable sound
- ✓ MPEG1 playback
- ✓ video and graphics must provide user with full-screen and full-motion video

That's why we believe you would be making a big mistake by not buying a multimedia computer. These systems include CD-ROM drives, **sound cards** (so your computer can make realistic sounds), microphones, and **speakers** (so you can hear the realistic sounds). The prices of multimedia computers are not that much higher than systems without these features, and it can be a real hassle trying to add a multimedia upgrade kit to your computer later.

When you're buying a multimedia system, there are a few specifications you should watch for. Make sure the system includes at least a **4X**, formally called a **quad-speed**, CD-ROM drive. The speed determines how quickly the computer can access the information from the CD. There are a few 6X and 8X CD-ROM drives available. The die-hard gamers should consider jumping to the 6X drive, but most users will be happy with a quad-speed drive, as this is the speed supported by almost all applications now, Frank says.

You also should check the kind of sound card included. It should be at least a **16-bit sound card**. The new "wave" in sound cards is **wavetable** sound. This kind of card uses a new technology, previously used only by musicians and computer enthusiasts, to make more realistic sounds. Unlike ordinary sound cards that may sound a little tinny, wavetable makes sound that's CD-quality. While wavetable may not be a requirement for someone who really gets into computer games or does a lot of work with sound and video files, it will be a necessity in the near future. The Multimedia Council has set specifications for an **MPC3** standard that will include at least a 75MHz Pentium, a 4X CD-ROM drive, and a wavetable sound card.

Cruising The 'Net

Computers are quickly changing from standalone units in which you do your work and keep to yourself. PCs now have turned into communication devices, letting you connect to other computer users or information sources around the globe, or simply to take phone messages. **Modems (MOdulator/DEModulator)** are the devices inside computers that let them communicate and exchange data with other computers via the telephone lines.

You can use them to transfer information and communicate with another user or to connect to commercial **online services** that provide access to weather, news, forums, and electronic mail. Modems also can let you connect to the **Internet**, which is the mother of all networks and lets you connect to users all over the world and to government, business, educational, and personal sites.

Most modems that come in today's PCs are **fax/modems**. This type of modem can be used to fax documents to other computers or to fax machines. It includes voice capabilities, so you can use your modem to answer your phone and take messages.

Because the online world is a rapidly expanding area, online technology is quickly changing—maybe more than in other areas of computing. You may be surprised to hear us say that consumers should start looking for a 28.8**Kbps** modem. (Kbps stands for kilobits per second, which is a modem's transfer speed according to how many bits of data can be transferred in one second.) Many computers include 14.4Kbps modems because these are the least expensive models on the market. However, both Phelps and Jackson agree that buying one would be a big mistake. Most major online services, such as America Online and CompuServe, already include access at 28.8Kbps in many major cities. Prodigy currently is testing its 28.8Kpbs access but will include it soon as well.

If you are price-conscious and simply can't afford a system with a 28.8Kbps modem, a 14.4Kbps or 19.2Kbps probably will do. But we suggest you lower your standards only if you absolutely can't afford a more expensive modem. The information found online has become much more graphical, and downloads can take quite a chunk of time. A 28.8Kbps modem will save you time on the download, and if you are using an online service, it will save you money because you won't be charged for as much time online. You really can't get much faster than a 28.8Kbps modem over current phone lines without special technology. And in light of the online world's rapid development, you'd be foolish not to buy what's the top-of-the-line in this area on your new computer system.

A Pretty Face

Most computer systems from popular manufacturers come with a preselected set of hardware components; you pick from their line and get what they offer as a complete system. The monitor, however, is often not included in the bundle. You can mix and match a monitor and computer system, which means you can be choosy about the type of monitor you want. Because it's the thing you'll be staring at all day, you will want to be a little bit picky.

Where Do You Fit In?

Who You Are	What You Need
Price-Conscious Consumer 	• 75MHz Pentium • 8MB RAM (16MB if can afford) • 800MB hard drive (1GB if can afford) • 28.8Kbps fax/modem (maybe 14.4, if hard-pressed) • 4X CD-ROM drive • 16-bit sound • SVGA .28dpi monitor, 14-inch
Average Home-Office Consumer 	• 100MHz Pentium • 16MB RAM • 1.6GB hard drive • 28.8Kbps fax/modem • 4X CD-ROM drive • 16-bit, wavetable sound • SVGA .28dpi monitor, 15-inch
Processing or graphics-intensive work, or Gamesters 	• 100MHz to 133MHz Pentium • 16MB RAM • 1.6GB to 2GB hard drive • 28.8Kbps fax/modem • 4X to 6X CD-ROM drive • wavetable sound • SVGA .28dpi monitor, 15-inch to 17-inch

You can find monitors in all kinds of sizes. The most popular are 14-inch and 15-inch. Some consumers, however, are even jumping up to the 17-inch. (The inch measurement, as with TVs, comes from measuring the screen diagonally.)

Monitors are becoming increasingly affordable. They start at about $150 or $200 and run up to $1,200 or more, Frank says. Pricing differences between a 14-inch monitor and a 15-inch monitor are fairly minimal so we suggest you get a 15-inch monitor to give yourself a little more viewing area.

Who needs a 17-inch monitor? Probably not the average consumer, although it's a handy extra. The 17-inch monitor is best for business users who will be doing a lot of graphics, spreadsheet, desktop publishing, or CAD (computer-aided design) work. It's nice if you want to fit more of your page on the screen and still have it be readable, Jackson says. For instance, a 17-inch monitor would let you see more detail in a graphic or more columns in a spreadsheet on-screen at once.

While monitors come in many sizes, there are only a few specifications that you should watch for. First, make sure the monitor is SuperVGA with a resolution of at least 1024 x 768. The **dot pitch** (the distance between like-colored dots on a monitor, measured in millimeters) should not be any higher than .28. The smaller the dot pitch, the better. Monitors with even smaller dot pitches of .24 and .21 are available and have great pictures, but you will find that .28 is standard and will suit you, Phelps says. Also be sure the monitor is non-interlaced. If it is, it will have the letters NI somewhere on the packaging. A **non-interlaced monitor** redraws the screen and refreshes the image, every line on-screen on every pass. An **interlaced monitor**, which may be a little cheaper, refreshes every other line on a pass, causing the image to flicker slightly and possibly giving you a headache. This shouldn't be much of a worry, however; most monitors are now non-interlaced.

PCs Hit The Road

Before you think too much about your monitor, processor, RAM, and other such specifics, consider whether you are a

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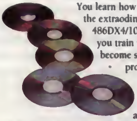
NRI's newest programming course helps you explore multimedia from square one, so nothing will be a mystery to you as you bring text and graphics to life with sound, animation, and photo-quality images.



You learn how to take full advantage of the extraordinary capabilities of the 486DX4/100 MHz multimedia PC you train with and keep. As you become skilled with the professional-level Asymetrix ToolBook authoring software also included in your course, you'll be able to add drama and impact to all your computer applications, ultimately creating the kinds of dynamic programs that will put you at the forefront of multimedia technology.

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- *540 meg hard drive*
- *3.5" floppy disk drive*
- *Super VGA color monitor*
- *Quad-speed CD-ROM drive*
- *Speakers*
- *Customized CD-ROMs*
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- *Windows 95*
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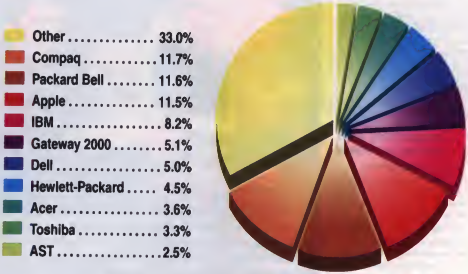
candidate for a desktop computer or for a portable system.

Does your business or job demand that you are on the move? Do you need access to your applications or information while on the road? Portable computers are lightweight and are great for doing business away from the workplace. You can access contact lists and accounting features, write reports, or send E-mail, without being in the office. Many portables include multimedia features so you can keep up with the latest software and modems to go online. However, they do have their drawbacks.

"With the miniaturization comes the price," Phelps says. "Feature to feature, you're going to spend as much as 50% more for the same machine in a portable as you would get in a desktop."

Although you may be able to use a CD-ROM and sound card, your portable screen is going to be much smaller. Expanding and adding capabilities to your machine also is easier on a desktop, Jackson says.

The Top 10 Computer Vendors*



Other	33.0%
Compaq	11.7%
Packard Bell	11.6%
Apple	11.5%
IBM	8.2%
Gateway 2000	5.1%
Dell	5.0%
Hewlett-Packard	4.5%
Acer	3.6%
Toshiba	3.3%
AST	2.5%

* According to 1995 forecast by International Data Corp.

According to a recent forecast by the market research firm International Data Corp. of Framingham, Mass., Compaq had the biggest percentage of the personal computer market in 1995 with 11.7%.

If you do fit into the portable consumer category, be sure your portable computer has a **PC Card drive** (formerly called a PCMCIA drive). You can plug credit-card-sized cards into these drives to add capabilities, such as a modem, more hard drive space, sound cards, CD-ROM driver cards (if you hook up a CD-ROM drive), network connection cards, and more. Phelps says most manufacturers include two Type 2 drives or one Type 3 drive. (For more information on PC Cards, see "New PC Cards Keep Portables Connected" in this issue.)

Get Your Extras

So far, we've covered all the basics you should watch for in a computer system. However, there are a few extras you need to consider.

Along with standard RAM, you'll probably need at least 1MB of **VRAM**, or **video RAM**. (Video RAM is a kind of memory that transfers images to your screen faster.) If you work often with graphics-intensive programs (such as CAD work and graphical design) or even play a lot of games, you may not need as fast a processor if you bump up the amount of VRAM you have to 2MB, Phelps says. This will take some of the heat off the processor and create video images faster. Another way to speed up graphics playback is to add a **video accelerator card** that will speed up the movement of video images and graphics, Jackson says. A video accelerator card plugs inside your computer and refreshes the screen faster and adds more colors.

If you're going to get a multimedia PC, be sure it includes **MPEG** capabilities, Jackson says. MPEG (Motion Pictures Experts Group) is a compression standard that your computer uses to produce full-screen graphics at a fast rate so that it appears as a movie. Many games on the market use MPEG to increase the visual experience, he says, and it's really the next wave in multimedia. Most brand-name computers probably will include this capability because it's a requirement for the new MPC3 standard.

Probably more valuable than any piece of hardware on your computer is the data that is stored inside. It's hard to put a price on all the hours you've put into your information, so you don't want to lose it in the blink of an eye. Almost all small business users, and many home users, should invest in some sort of **backup** system. Backing up is rule number one of computer use, says Michael Farabaugh of Modern Computing Concepts in West Warwick, R.I. If your hard drive goes down or you can't get at the information inside, a backup is one of the best ways you have to recover.

One of the simplest, most effective ways is through a **tape backup drive**, which stores data on a magnetic tape. It will cost you about $200 or more for the drive, while a tape is about $25, Frank says, but it's money well spent. You can store only your files, or all your applications, and set up the drive to record the information at set intervals, such as every evening after you're done working. Or, Phelps suggests, consider one of the new **Zip drives**, such as those from Iomega, which are similar to a compressed, removable hard drive. This drive is about $200, and then you pay about $20 for removable cards to plug into the drive. But with the time and money it will save you recovering from data disaster, it's worth it for the small business or home user who uses the system for work or family finances. For a user who simply uses the system for games and a little word processing, simply backing files up to diskettes might be a more economical route.

Plan Backwards—Software First

All this help is fine, but what happens in few months when the advice we've given goes the way of the dodo, and the technologies we've suggested have dropped to the back of the market? Regardless of the time or technology, there are a few things to keep in mind.

The most important thing to do before you buy a PC is to decide what you want to do with it. Do you want to write letters and reports? Do you want to communicate with friends and business associates online? Do you want your computer to answer your phone? Do you want it for business or family finances, as well as to play a few games or educational programs? If you're unsure what you want to do or what the computer can do, talk to friends with computers or ask the salesperson at the computer store.

Then check out the programs that will let you do these tasks. Find out which products are the most popular or best ones in the categories, by word of mouth or from magazines such as this one. Next, peruse the software aisles and check the sides of the boxes. Just like ingredients on cereal boxes, the software boxes provide lists of what components your computer needs to run the software. Then, finally, you can check out the computer systems.

Also remember to provide for a little "fudge factor," as Phelps calls it. You don't want a system that just has enough requirements to run this software; you want it to last a couple of years. Check out the recommended requirements (not the minimum requirements) for the software and then add a little room—about one step above what's recommended—for your system.

The most important thing to do before you buy a PC is to decide what you want to do with it.

For a basic business user who wants to do word processing, spreadsheets, accounting, and keep a few mailing lists, even a 75MHz Pentium may be overkill, Phelps says. However, you want that leeway so your system will last them an average of three to five years before it requires any additional hardware upgrades or a new system altogether.

"Everything hinges on what you are going to do with it," Frank says. "The computer is the tool, and all your applications and what you are going to use it for is the engine. You don't buy your tools before you figure out what you are going to work on. You have to have your subject (the computer), and then purchase the tools to work with that."

Rules Of Thumb

Obsolescence means that sometime in the future, your computer won't be able to do the things you want it to do or run the programs you want it to run. For a home user, that can be anywhere from three to 15 years, depending on the things they want to do with the computer. A computer used only for word processing and a little online usage can last years longer than one used to play the latest games and educational programs. For a small business, that period can be even shorter, probably only three years for a computer that has to run the latest business software. After that, the computer either will need to be upgraded with more RAM or a new microprocessor, or you might even have to buy an entirely new computer. It's also a good idea to keep in mind how long your computer probably will last when you are purchasing it. From that, you can tell how much power you'll need. Then, Frank says, consider what you want to be doing with your computer in two years.

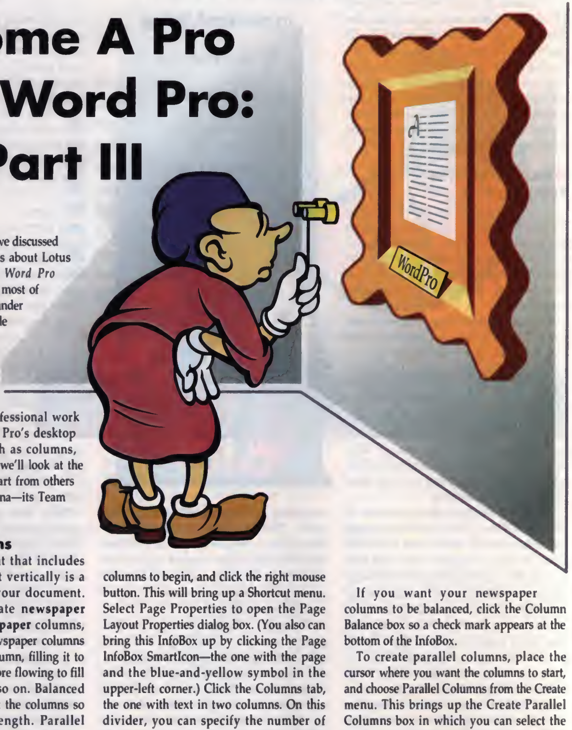
And remember, the power and performance of a system aren't the only considerations you should have when buying. A very important factor is the warranty: Is it one year, three years, or one year or longer? And what does it cover? Just parts, or parts and labor? Find out if you have to bring the computer in or if the service is on-site, meaning they'll come to your home to fix it. Another factor that seems somewhat minor, but can be important when you get home, is whether or not the computer is going to fit where you plan to put it. Will that 17-inch monitor fit into your built-in computer cabinet?

Finally, leave yourself enough room to expand your system. Make sure you've got two to three extra serial and parallel ports and more than a handful of extra expansion slots on the inside that you can plug expansion cards into. (**Serial ports** usually are used for modems, mice, and scanners, while **parallel ports** are commonly used for printers.) You want at least three to four bays on the front of your computer for your diskette drive, CD-ROM drive, and some extras you may add in the future.

Approach your computer purchase backwards first. Figure out what you want to do with it, find the software that will do it, and give yourself some leeway. With these rules of thumb, you are ready to make a buying decision today or years down the road. ●

by Cindy Krushenisky

Become A Pro With Word Pro: Part III



If you practiced the tips we discussed in our last two tutorials about Lotus Development Corp.'s *Word Pro* word processor, you've got most of the word processing basics under your belt. You now can tackle some tasks that can truly make you a word processing pro.

First, we'll examine how to turn any document into a professional work of art by exploring Word Pro's desktop publishing features, such as columns, graphics, and tables. Then we'll look at the tools that set Word Pro apart from others in the word processing arena—its Team Computing features.

Creating Columns

Creating a page layout that includes columns that divide text vertically is a quick way to dress up your document. Word Pro lets you create **newspaper** columns, **balanced newspaper** columns, and **parallel** columns. Newspaper columns let text flow down one column, filling it to the bottom of the page before flowing to fill the second column and so on. Balanced newspaper columns adjust the columns so they are all the same length. Parallel columns group text across a page so the next row in one column starts underneath the longest column in the previous row. These columns often are used for scripts, speeches, and debates (see Figure 1).

To create newspaper columns in Word Pro, place the cursor where you want the columns to begin, and click the right mouse button. This will bring up a Shortcut menu. Select Page Properties to open the Page Layout Properties dialog box. (You also can bring this InfoBox up by clicking the Page InfoBox SmartIcon—the one with the page and the blue-and-yellow symbol in the upper-left corner.) Click the Columns tab, the one with text in two columns. On this divider, you can specify the number of newspaper columns you would like, the desired space between columns (in inches), and whether or not you want lines (called **rules**) between the columns. You can select the style of the rules, their width (in **points**, a typographical measurement where 72 points equals 1 inch), and color.

If you want your newspaper columns to be balanced, click the Column Balance box so a check mark appears at the bottom of the InfoBox.

To create parallel columns, place the cursor where you want the columns to start, and choose Parallel Columns from the Create menu. This brings up the Create Parallel Columns box in which you can select the number of columns you want and, with a Quick Layout feature, whether you want a layout with equal column widths or varied column widths. Once you've made your selections, click OK.

Although columns can help dress up your document immensely, adding graphics is the best way to give your documents a professional look.

If your computer has enough available hard drive space and random-access memory (RAM) to accommodate the size of graphics you want to work with, Word Pro will let you import graphics and drawings directly into its documents.

■ Adding Pictures

If your computer has enough available hard drive space and random-access memory (RAM) to accommodate the size of graphics you want to work with, Word Pro will let you import graphics and drawings directly into its documents. To do so, you should create a frame for your graphics before bringing them into your document.

NOTE: If you prefer, you can import a graphic without creating a frame. Word Pro will create a default frame, but the size of the frame will depend on the size of the graphic. By inserting a frame first, you can more easily control a graphic's size.

To create a frame, place the cursor where you want the frame to appear in your document. Choose Frame from the Create menu to bring up the Create Frame dialog box. In this box, you can select the frame's style (you'll probably stick with the Default style), and select its width and height. Then click OK, and the frame will automatically appear in your document. If you prefer, however, you can draw the frame in the document yourself. Click the Size & Place Frame Manually option. Your cursor will become a box with a cross hair in the upper-left corner. Draw the frame in your document by clicking the mouse where you want the upper-left corner located and dragging it to where you want the lower-right corner located. When you let the mouse button go, the frame will appear.

NOTE: You also can create a frame manually by clicking the mouse pointer on the Frame SmartIcon—this icon has a box with a cross hair in the upper-right corner and a mouse pointer in the lower-left corner. After clicking the icon, place the mouse pointer where you want the frame, and click and drag the frame pointer until it expands to the desired size.

Frames let you easily manipulate your graphic images by changing their size or position. To alter a frame's size proportionately, position the mouse cursor over a corner of the frame until it turns into a double arrow. Then click and drag the mouse pointer until the frame is the size you want. To change a frame by making it wider or taller, position the mouse pointer in the center of a frame side (until it becomes a double arrow), and drag it horizontally or vertically until the frame is the size you prefer.

To move a frame, click the mouse pointer inside the frame to make the frame active. Then place the pointer at the edge of the frame until the pointer turns into a hand symbol. Click and drag the hand symbol to where you want the frame on the page. (As you move the frame, the hand symbol will close around it, dragging it along.) When the frame is properly positioned, let go of the mouse button. The frame will be relocated.

Once your frame is created, sized, and placed, it's time to add graphics. Word Pro lets you import several different graphic types, including bit-mapped files (.BMP), Corel images (.CDR), Encapsulated PostScript files (.EPS), JPEG files (.JPG), PC Paintbrush files (.PCX), Kodak Photo CD files (.PCD), and Tagged Image File Formats (.TIF).

NOTE: Word Pro also lets you create your own drawings. For more information about using Word Pro's drawing tools, see the program's Online Help. Also watch for future Word Pro Quick Studies in PC Novice. We'll cover the drawing tools in a future article.

To import a graphic, you need to activate the frame in which you want to insert it. Once the frame is activated, choose the Import Picture command from the File menu, which brings up the Import Picture dialog box. In

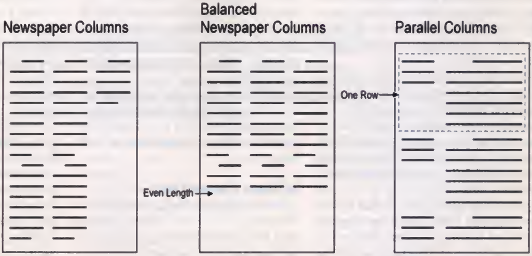
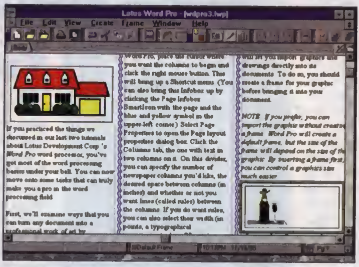


Figure 1. ***Word Pro* columns can be set up as newspaper columns, balanced newspaper columns, or parallel columns.**

this box, select the file by choosing the file name, directory, and drive in which it is located. You also should select the file's type. And, if you want to make sure you have selected the right graphic before inserting it into your document, you can click the Preview box to view the image in the dialog box. When you're sure you want to import the picture, click OK. It will appear inside the frame in your document.



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Word Pro's desktop publishing features let you combine text in columns with graphics.

■ Editing An Image

If you want to change your image's appearance, you can edit .BMP, .TIF, .GIF, and .PCX images or move any image within a frame.

To edit an image, select the frame that contains the graphic, and double-click the image in the frame. This activates the Image menu. By choosing Image Properties from this menu, you'll bring up the Image InfoBox that lets you change the image's brightness and contrast, blend jagged areas within a picture, and even reverse the image in color or black and white so it looks like a photo negative. To see the results immediately, click the Apply button.

To move a graphic or picture within a frame, double-click the picture. Word Pro will display an open hand symbol. Dragging the hand symbol will move the picture within the frame without moving the frame.

■ On The Table

Next, we will discuss the desktop publishing tools that let you create tables. Tables help you organize information and present data in an interesting way for readers. Word Pro makes creating and formatting tables easy.

To create a table, select Table from the Create menu to bring up the Create Table dialog box. In this box, you can select the number of columns and rows you want in your table as well as the table's style. (You'll probably choose the Default Table style). Then click OK, and the table will be inserted into your document.

If you prefer, you can click the Size & Place Table Manually button. This turns the mouse cursor into a table with a cross hair pointer in the upper-left corner. Click the pointer where you want the upper-right corner of the table to appear. Then drag the mouse pointer to where you want the lower-left corner. A table will be inserted into your document.

NOTE: You also can create a table manually by clicking the Create Table SmartIcon, which has a table on it with a cross hair in the upper-right corner and the red arrow at the bottom. Clicking the icon brings up a box in which you can choose the number of columns and rows you want to appear in your table. Once you select the number by highlighting the columns and rows with your mouse, the table appears in your document, located where your cursor was placed.

After inserting a table, click in a cell to activate that cell, and type in the data you want. By clicking in a cell, you activate the table and bring up the Table menu, which lets you format the cells and spice up the table's appearance. Choosing Table Properties from the Table menu brings up the Table Properties InfoBox. In this box, you can add lines, shadows, colors, and patterns to your table, making it more eye-pleasing and more effective.

Now that you know how to dress up your documents with Word Pro's desktop publishing features, let's look at the features that really make Word Pro stand out—its Team Tools.

■ Team Computing

Word Pro shines at the office with its Team Computing tools, which can make a team more productive by helping gather, process, distribute, and review information.

Most people in business today have served on a team or committee where they were expected to write a report or recommendation in addition to their regular work. Given the pace of business today, working on a document as a group is not easy. Most people write the document, or portions of it, on their own. They then print the document, distribute it, and ask other group members for their comments. If they're lucky enough to get a timely response, it's a big effort to consolidate everyone's comments. The process is then repeated until everyone is happy with the results. Word Pro has tried to make this exhausting and time-consuming work easier with its Team Computing tools.

The Team Computing tools let each member of a team contribute to the group effort while eliminating these hassles. These tools include Versioning, TeamReview, TeamConsolidate, and TeamMail. Here's a closer look at each of these tools:

Versioning. Word Pro's Versioning feature lets you create multiple versions of a document without saving multiple files by creating multiple versions of a single document. For example, one document (such as Report.lwp) can contain the Draft Version, Version 1, Version 2, Version 3, etc.

This feature provides several advantages. Often, when saving different versions of files, the name of the most recent version is forgotten. Versioning gives you access to all versions and their names. In addition, you easily can see changes others make by comparing an edited version to the original version. There's no chance that the original document will accidentally be changed permanently. You also save precious disk space since Word Pro saves only the differences between versions rather than an entire copy of the document.

Versioning also lets you track the history of the document. Through the Versions For File dialog box, you can look up the names of the version, the names of the people who have edited the version, the date and time the version was last edited, and any remarks entered about the version. To display this box, choose Versions from the File menu. This is also where you can create a new version, delete a version, change the name of a version, and save a version as a completely separate file.

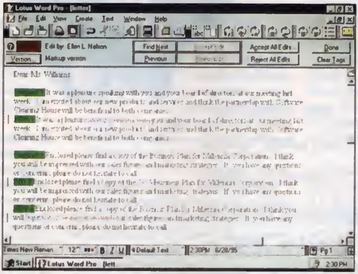
To benefit from versioning, those reviewing your document must create a new version of the document before they edit it by choosing Versions from the File menu, then clicking the Create Version button in the Versions For File dialog box. This will bring up the Create Document Version box. They then specify a name for the new version, add a comment or remark describing the new version's contents, and click OK.

TeamReview. The TeamReview feature lets you set up a document for editing and distribution by walking you through the assignment of reviewers to a document, the assignment of editing rights to each reviewer, and the distribution of a document.

To activate the TeamReview feature, choose TeamReview from the File menu. This brings up the TeamReview Assistant dialog box, which has three tabs.

Step 1: The Who tab lets you select someone to review the document. Create or edit a reviewer's list by using the Add and Remove buttons on the right side of the reviewers' names box.

Step 2: The What tab sets up editing rights, letting you determine what editors can and cannot do to the document, such as whether reviewers can edit the document in the current version or whether they must create a new version. These rights can be different for each reviewer. This tab also lets you type a greeting that Word Pro displays when the reviewer opens the shared document. For example, you could type the greeting "Check the proposal figure for the labor area" or "Create a new version before editing" in the box.



***Word Pro's* TeamConsolidate feature combines document versions edited by many people into one document. A Review Bar is displayed automatically, containing tools to review and accept or reject edited versions.**

Step 3: The How tab lets you select how you want to distribute the document. You can save the document as a file, as an Internet file, or send it through electronic mail. (If you choose the send it as E-mail, Word Pro brings up the TeamMail dialog box.)

TeamMail. The TeamMail feature lets you send a document to other team members or route it to people using your company's E-mail system.

With TeamMail, you can create a text message and send it by itself to team members. You can also attach all or part of a document to the message. And you can send a document attachment to several recipients at once (called **broadcast** messaging) or route it from one recipient to the next (called **routed** messaging), letting them build upon each other's edited versions before returning it to you.

The TeamMail dialog box has three tabs: Basics, Tracking, and Options. Basics lets you specify who receives the document and how it will be distributed. Tracking lets you choose a method to track the progress of a document. (For example, you can request to be notified each time a recipient opens or forwards the document.) Options lets you specify whether you want the document returned, whether recipients can modify the route, or both.

TeamConsolidate. Once you receive input from multiple reviewers, you can use the TeamConsolidate tool to combine this input into one file. This requires three steps.

First, you must consolidate the files. TeamConsolidate combines them into one file.

NOTE: You only can consolidate files. If you've created several versions of a document, you must first save them as files before you use TeamConsolidate to compare them.

To consolidate the files, display the file to which you want to compare the other files. Then choose TeamConsolidate from the File menu. The TeamConsolidate dialog box will pop up. In it, you select the files you want to compare to the displayed file, and choose whether you want to view changes in the current file or create a new one. Then click OK.

Now, review the edited versions. You'll usually want to edit a **markup** file, which combines all the editing changes made in all the files. When comparing several documents, a paragraph containing the editing changes is displayed below the original paragraph in the markup file. The original file is marked as *Original*, and the edited paragraph is marked with the initials of the person who first edited the paragraph.

Finally, you create the final document. Using the Review Bar above the markup document, you can accept or reject edited material individually or all at once. If you prefer, you can hide the review bar and edit the document manually, just as you would edit any other file. After reviewing all the edited versions, you can save the document as a new file or overwrite the current file.

Putting It Together

As you can see, Word Pro is a full-feature word processor with advanced desktop publishing features that lets you make professional documents. Word Pro's Team Computing tools make it easier to share documents and gather comments by automating the writing and editing process. Knowing about these features and understanding how they work is a first step to becoming a pro with Word Pro. The rest takes lots of practice. Now that we've got you started, you're on your way. To keep you learning new features and tricks, we'll cover Word Pro in future issues under the Quick Studies section. We look forward to seeing you then. ●

by Lori Beckmann Johnson

Unhappy New Year

The Year 2000 Could Prove Disastrous For Unprepared PCs

The ball in Times Square, with Dick Clark on hand, will inevitably drop during the first moments of the year 2000. Don't let your computer drop the ball as this fateful new year arrives. Though you probably don't realize it, that New Year's Day poses a serious threat to your computer's proper functioning.

For anyone whose life is touched by a computer, and that includes all of us by now, the date change from the 1900s to 2000 will have to be dealt with, or the consequences will be severe. For the average, home PC user the change may not be that dramatic. But for the business world, the potential for disaster is very real.

One could call it a two-digit problem. The majority of computer programs make use of dates represented by only two digits—96, for example, instead of 1996. This saves space and is easier, unless you are working outside the years 1900-1999. This problem isn't new. The banking industry dealt with it as long ago as 1970 when application programs hit snags while trying to figure amortization and interest figures for 30-year mortgages.

"If you have a computer chip of any kind, there is a date calculation," says Peter DeJager, an independent consultant for managing the impact of technological change. "If it is a two-digit year date, when the year clicks over to 2000, you'll have a problem."

If ignored, the implications are staggering. What will happen in the first quarter of 2000 when a business cannot process its 1999 end-of-year billing; corporate credit cards are refused most transactions because their accounts appear delinquent; or end-of-year profits cannot be accurately accounted? Even household and personal finances could run awry of creditors if the situation is handled improperly.

"If your business' accounting system is on a computer, you may not be able to produce accurate invoices," DeJager says. "If I, the customer, feel the invoice isn't accurate, I'm not going to pay. If I don't pay, there isn't going to be any cash flow. And if there is no cash flow, how long are you going to survive?"

Hardware isn't to blame. The problem is directly related to application programs. When the codes were written in the late '60s and early '70s, the hardware in use was very constricted. Every byte of saved storage was precious in those Stone Age days. In the late 1960s, the popular method of entering data into a computer-based system was the 80-column key-punched card—72 data characters and eight characters reserved for control information. Using two digits to enter a year seemed to make much more sense than using four. Some systems still used even are based on a single-digit year. The problem is this: Programmers never imagined that their codes would survive 20 or 30 years.

"We tend not to replace codes completely, like a car," DeJager says. "We like to plug and patch and fix them up. Almost all systems contain pieces of code from the previous system."

■ Heads In The Sand

GartnerGroup research indicates that 20% of business applications will fail because of invalid date computations in 1995 and that 90% will fail by 1999. Failure includes programs ending abnormally, or worse, returning incorrect results.

It's unsettling to hear DeJager estimate that 70% to 80% of all businesses are not doing anything about it. "GartnerGroup estimates that only 50% aren't doing anything," he says, "but no matter what the number, 50 or 80, it's still too high."

To make things worse, the problem grows with the sale of each program that won't be able to handle the date change.

How could a small factor such as two little digits lead to such problems? A good analogy would be the tiny, electrical part that led to the blackout of the Eastern Seaboard in the mid-1960s. It was a $15 part that led to that catastrophe. The date change to 2000 will affect every computer program, even if the year indicates nothing more than when a file was created.

If the hassle of the change to 2000 alone doesn't have you bemoaning the end of the decade, the cost will. DeJager estimates that the problem worldwide will take between $200 billion and $600 billion to solve—nearly half a trillion dollars.

GartnerGroup estimated that for a medium-sized company (one that has approximately 8,000 programs that support business operations), the cost of addressing the year 2000 problem will be approximately $450 to $600 per program, or $3.6 million to $4.2 million. That's based on a formula of $.30 to $.40 per line of code and 1,500 lines of code per program. Tools will aid in the sizing of the problem as well as reducing by half the cost of addressing the crisis.

Time is another staggering expense. For a medium-sized company, it will take 24 staff people one year to implement a solution, or 12 staff people with tools one year (plus time to gain expertise in the tools). This is assuming, of course, that a company can afford to allocate that kind of staffing to the problem.

"A bank will take anywhere from $2 million to $150 million, depending on its size," DeJager says. "Think about it . . . banks have been writing code for 30 years. If it's still running, it has to be fixed. It's going to take a tremendous amount of staff. And how much code do we have, anyway? Most companies don't have any idea."

The thing companies really hate about a problem like this is that it is all maintenance and no profit. "It's always been seen as strictly an expense," DeJager says. "Information systems people don't really want to bring it up. It's like, 'Oh, by the way, that code we wrote for you four years ago is no good, and we'll need another $10 million to fix it.' That's not good news, and they don't want to deliver it. That's why not a lot has been done because a lot of companies haven't been notified."

The bottom line is that while you may not be able to make a profit off the change to 2000, at least if you deal with it, you'll still be in business, period. "The effect of not fixing it will be catastrophic compared to fixing it," DeJager says. "And the cost will be insignificant compared to what will happen if you ignore it."

Some software makers are already on the ball. Great Plains Software of Fargo, N.D., makes accounting software for Windows, DOS, and Macintosh systems including *Great Plains Dynamics*, *Dynamics CS+*, and *Great Plains Accounting*. Director of Middle Market Products Cecil Bordages says Great Plains has been making year 2000-compliant software since 1992.

■ See It Coming

"I'm sort of shocked and amazed it's as big an issue as it has become," Bordages says. "Everyone knew it was coming. It's not like waking up one morning and finding that the Internet is big."

Bordages is finding that a lot of large corporations are surprised that Great Plains isn't stumped by the problem. "A lot of potential customers are surprised that it's not an issue for us because their traditional vendors are having a hard time with it," he says.

Another source for software that is year 2000-compliant is Dun & Bradstreet Software Publishers, which publishes finance, procurement, budget, human resource, and manufacturing and distribution software applications.

The problem isn't difficult to figure out. One solution is simply to use a four-digit year. For customers who want to retain a two-digit year, Bordages says to simply pick a set point in the system when, if a number is greater than a set number, it is automatically assigned a certain century. Let's use the number 35. Any number above 35 is automatically prefixed by 1900; any number below 35 automatically is assigned the century 2000.

"The underlying assumption," Bordages says, "is that the accounting data you're using won't cover more than 200 years, which seems pretty safe." For now, at least.

Here are some tips for dealing with what is less-than-affectionately known as the "millennium bug":

- **Assess the problem.** Examine every application and database, including archived copies, to determine the extent of the problem you face. Not only might you be surprised at the number of applications you have, but the shape they are in. Many have been patched or customized several times over the years, but not documented, and the people that did the work are nowhere to be found. How much time will it take? Find out what plans, if any, vendors have for fixing the problem. Will the fix be available in the release installed, or will an upgrade to a new release be required and, if so, how much will it cost?
- **Tools.** Are there any? When will they be needed? Who will they come from? Will they be developed in-house or must they be acquired? Find out who the vendors and products are, then acquire them and learn to use them.
- **How will the work get done?** Will it be done in-house, will contractors be used, or will it be outsourced? If done in-house, how much can it be incorporated into normal, ongoing maintenance? The key question is whether to invest already scarce resources into making the change to save incremental expenses or to have someone else do it and allow transition efforts to continue.

The clock is ticking . . . what are you doing about it? ●

by Richard Egan

The bottom line is that while you may not make a profit off the change to 2000, at least if you deal with it, you'll still be in business, period.

For More Information:

Great Plains Software
1701 Southwest 38th St.
Fargo, ND 58103
(800) 456-0025
(701) 281-0550

Dun & Bradstreet
3445 Peachtree Road, NE
Atlanta, GA 30326-1276
(404) 239-4357

Lotus 1-2-3 5.0

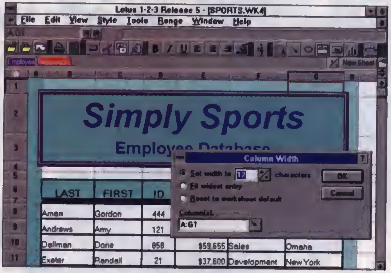
Resizing Columns & Rows

5.0 FOR WIN

SPREADSHEETS

Have the contents of a spreadsheet cell ever suddenly changed to asterisks while you're working on your data? If so, you shouldn't panic; your information is still there. When a value is too wide to fit in a cell, it appears as a line of asterisks or in scientific notation. Changing the width of the column will redisplay the value.

Row height also can be changed to improve the appearance of your worksheet data. It is automatically changed in *Lotus 1-2-3* to match the height of the largest font, but you also can change height manually.


Lotus 1-2-3 Release 5 - [SPORTS.WK4]
File Edit View Style Tools Range Window Help
New Sheet
Simply Sports
Employee Database
Column Width
OK
Cancel

● Set width to 12 characters
○ Fit widest entry
○ Reset to worksheet default

Column(s): A:G1

LAST	FIRST	ID			
Aman	Gordon	444			
Andrews	Amy	121			
Dallman	Dona	858	$59,655	Sales	Omaha
Exeter	Randall	21	$37,600	Development	New York

Using menus or click-and-drag operations, you can adjust column widths and row heights to fit your worksheet's data.

■ Adjusting Column Width

By default, your columns are nine characters wide. You can change the default width by selecting Style, Worksheet Defaults, Column Width and entering the width you want for all or most of your columns. You then can override the default width for specific columns with the option of resetting columns to the default if needed.

To change column width, drag with your mouse, or use Style, Column Width from the menu. To change a column's width by dragging, move the mouse pointer to the letter of the column. Point at the right column border so that the mouse pointer changes to a black, two-headed horizontal arrow. Drag to the left to narrow the column or to the right to widen it. Release the mouse button when the column is the correct width.

You can resize more than one column at a time by dragging. Click and drag the column letters to select them. Point to a border between any of the columns that are selected so that the pointer changes to a black, two-headed horizontal arrow. Drag left to narrow the column or right to widen it, and release the mouse button. The width of all the selected columns will be changed to match the one you dragged.

To change columns to a specified width, select a range of cells in the columns you want to change, such as cells A2..C2 for columns A through C. Choose Style, Column Width. In the dialog box, you can set the width to a specific number of characters from 1 to 240 or reset the column to the worksheet default width. Or, use the Fit To Widest Entry option, which adjusts each column to the width of the widest entry in the selected range. Choose OK to exit to the worksheet.

Another way to access the Style, Column Width dialog box is to right-click a column letter, and choose Column Width from the resulting menu. A simple method of setting the column width to fit the largest entry is to move the mouse pointer to the right border of the column letter until the pointer changes to a black, two-headed horizontal arrow and then double-click the column border.

■ Changing Row Height

Row height is automatically adjusted to match the height of the largest font of the data entered in the row. You also can change the height manually by dragging a row border or by using Style, Row Height.

To change a row by dragging, move the mouse pointer to the number of the row, and point to the lower border of the row so that the pointer changes to a black, two-headed vertical arrow. Drag up to narrow the row or down to widen it, and release the mouse button. Use care when dragging because sometimes an adjacent row will disappear. If this happens, it can be redisplayed by dragging on the rows above and below it.

You can change the height of more than one row at a time by selecting the row numbers and pointing to a border in the selected range so that the pointer changes. Drag up to narrow the row or down to widen it, and release the mouse button. The height of all the rows will change to match the height of the one you dragged.

To change rows to a specific height, select a range that includes cells in the rows you want to change, and choose Style, Row Height. In the dialog box, you can set the height to a height from 1 to 255 points. When you set the row height to a specific number of points, it no longer automatically adjusts to fit the largest font in the row. The dialog box has an option to reset the height of each selected row to the height of the largest font in the row.

You also can display the Style, Row Height dialog box by right-clicking a row number and selecting Row Height from the resulting menu. ●

by Diane K. Walkowiak

PageMaker 5.0

Producing Simple Graphics

The first two *PageMaker* tutorials taught you how to make type specifications and import text and graphics files into your PageMaker documents. Now you want to learn how to create your own graphics. That's easy. PageMaker has tools that produce simple graphics for your publications.

■ Line Tools

Lines and shapes can enhance the look and impact of your document by calling attention to important items or showing relationships between elements, such as lines connecting boxes in a flowchart.

Draw lines with the line tool (the diagonal line in the toolbox) or the constrained-line tool (two intersecting lines). The line tool lets you draw diagonal and straight lines. To draw diagonal lines, drag the cursor anywhere on-screen. To draw straight lines, press the SHIFT key as you drag the cursor. You also can use the constrained-line tool (which produces only straight lines) and drag the cursor anywhere on-screen.

NOTE: To display the toolbox while you work, open the Window menu and select Toolbox, or press CTRL-6. You can open PageMaker's palettes from this menu or by using a CTRL-<key> combination, which is next to the command in the menu. (PageMaker uses a carat [^] to represent the CTRL key.)

To change the weight or use patterned lines, go to the Element menu's Line command, and select one of the weights or patterns in the submenu. You can create your own line weights up to 800 points by choosing the Custom option in the submenu and entering a value in the Custom Line dialog box.

■ Shapes

PageMaker's rectangle and ellipse tools let you draw rectangles, squares, ovals, and circles.

- To draw a rectangle, select the rectangle tool (the square in the toolbox), and drag the cursor diagonally downward.
- For a square, select the rectangle tool, and press the SHIFT key as you drag the cursor.
- To make an oval, select the ellipse tool (the circle in the toolbox), and drag the cursor.
- For circles, select the ellipse tool, and press the SHIFT key as you drag the cursor.
- To make rectangle corners round, select the Element menu's Rounded Corners command. Choose a style, then click OK.

You can fill shapes with colors or patterns by using the Element menu's Fill command and choosing a pattern in the submenu. To fill an object with color, select the Window menu's Color Palette command (or press CTRL-K) for a list of available colors. Select the object, then a color from the palette. If you only want a tint of the color, use the Fill command, and choose one of the listed percentages. To fill a shape with white, either select the Paper option in the Fill command's submenu or [Paper] in the Color Palette.

NOTE: To select an object, click the pointer tool in the toolbox, then click the object.

If the line around your object has a different color, you can delete the line by choosing the None option in the Line command's submenu or assigning the fill's color to the line. With the shape selected, choose the Line option in the Color Palette's Color menu, and click the fill's color in the palette.

■ Moving & Changing

To resize a graphic, select it, and drag one of the handles anywhere on-screen. To move a graphic, simply select and drag it to the desired location.

By selecting the Element menu's Fill and Line command, you activate the Fill and Line dialog box, which lets you edit color, pattern, and weight all in one place. Click the arrows beside the Fill, Line, and Color options, and make a selection from the submenus.

■ Duplicating & Stacking

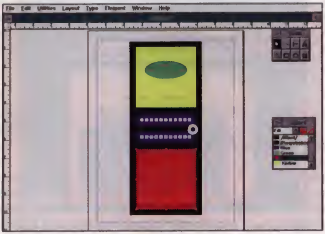
To duplicate text blocks and graphics, click an object. Select the Edit menu's Copy command, then the Paste command. The copy appears on-screen, to the right of the original. If you want the copy pasted on top of the original, press SHIFT-CTRL-P. This is helpful when you want to place the copy and original right beside each other. Align them by pressing the SHIFT key as you move the copy.

To make many copies at once, select the object, and use the Edit menu's Multiple Paste command. In the resulting dialog box, enter the number of copies you want and any horizontal and vertical offset values, then click OK. To paste copies on top of the original, use zero as your offset values. To do multiple pasting without opening the dialog box, press the SHIFT key as you select the Multiple Paste command.

You probably have several lines and shapes on your page by now. Some of them may be on top of others. You can change the stacking order of elements by using the Element menu's Send To Back or Bring To Front commands.

Now that you know the basics of creating your own graphics, keep practicing. ●

by Annepely P. Dakay



PageMaker 5.0's graphics tools let you create lines and shapes that you can move, resize, rearrange, copy, paste, and fill with colors and patterns.

Microsoft Word 6.0

Customizing Documents With Sections

If you've ever tried to create a *Microsoft Word* document with single and multicolumn pages or text laid out in both portrait and landscape orientations, you've learned how difficult it can be—unless you use Word's Break command to organize the work in "sections." By default, Word documents contain a single section; any formatting changes are applied to every page in the document. With the Break command, you can format sections separately.

Working in sections is handy if you want to create a document with a flexible numbering scheme (e.g., one that uses Roman numerals for a table of contents and Arabic numerals for the document body) or vary the content and layout of document headers and footers. Similarly, it's easy to produce a newsletter with a single-column headline and a multicolumn body. Sections can be as small as a single paragraph or as many paragraphs as you want.

Gimme A Break!

To create a new section, position the cursor at the point where you want the new section to begin, then choose Break from the Insert menu. The Break dialog box offers several section break options. Choose Next Page to start a new section at the top of the next page. Select Continuous to begin a new section without a page break. When you opt for Continuous, text in the new section immediately follows text in the previous section. If the previous section has multiple columns, Word is "smart enough" to balance the text laid out in those columns. Consider using Continuous at the end of a document when the final section is laid out in columns; issuing a Continuous section Break command ensures that columns in the next-to-last section have a balanced look.

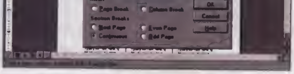
The Even Page option directs Word to start a new section on the next even-numbered page. Word leaves an odd-numbered page blank if the new section falls on an even-numbered page. The Odd Page option does the same for odd-numbered pages.

Playing The Numbers

Script writers, authors, or legal eagles penning contracts can turn on Word's "line numbering" capabilities for different sections of a document. To set up a section so that it displays line numbers for quick reference:

1. Choose Page Setup from the File menu, or double-click above the marks in an unmarked part of the ruler.
2. Click the Layout tab.
3. Select Line Numbers.
4. Check the Add Line Numbering box in the Line Numbers dialog box.
5. Choose the line numbering options you want to apply, then click OK.
6. Decide whether your line numbering choices apply only to the section where the cursor is currently located or to all sections from the insertion point to the end of the document.
7. Click OK.

NOTE: To see line numbers, switch to Page Layout view or Print Preview. Word does not display line numbers in Normal view.



To create a new section, position the cursor at the point where you'd like the new section to begin, select Break from the Insert menu, and choose from the available options.

Other options in the Page Setup dialog box also can be applied to selected sections, all sections from "this point forward," or the entire document. For example, you can use the Vertical Alignment option (File, Page Setup, Layout) to adjust how Word lays out text vertically on a page. Choices include Top to align the top line of text with the top margin, Center to center page paragraphs between top and bottom margins, or Justified to adjust the space between paragraphs so that the top line aligns with the top margin while the bottom line aligns with the bottom margin.

To control page numbering in a section (e.g., begin a section with a particular number), place the cursor in the section you want to format, choose Page Numbers (from the Insert menu), click Format, select the Start At page numbering option, then enter the number that you want as the beginning number for that section.

Deleting Breaks

When you issue the Break command, Word places a nonprinting, section break mark in the text at the insertion point. If you click the standard toolbar's Show/Hide button, you can locate these marks. Each section break appears as a double dotted line, containing the word "End of Section." Double-clicking this line opens the Page Setup dialog box, with the Layout tab already selected. You also can identify the section currently harboring the insertion point by reading the status bar at the bottom of the screen.

A section break controls formatting for paragraphs that follow and can be copied and pasted. To remove a break, click the cursor below the section break double line, then press the Backspace key, or place the insertion point just before the section break and press DELETE. When you remove a section break, text following the deleted break takes on formatting characteristics of the preceding section. ●

by Carol S. Holzberg, Ph.D.

Microsoft Excel 5.0

Using Formulas In Expense Reports

If you've followed along for the last two months, you know we're creating an expense report in *Microsoft Excel*. This month, we add the "magic" of formulas. When you finish this tutorial, your expense report will be able to calculate your expenses—down to the last penny the company owes you, or vice versa.

Preparing Your Report

Before you add formulas, you should format your spreadsheet cells. Since most of your entries in the expense report will be currency, we'll make a block currency format. Highlight cells C6 through O16, then select Cells from the Format menu. In the resulting Format Cells dialog box, choose Currency under Category. You'll see several options in the Format Codes box. Choose an option that shows cents. Do the same thing with cells O17 through O19.

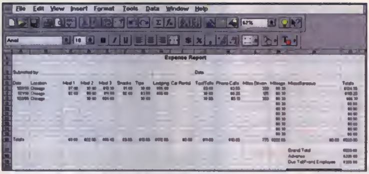
Now we'll format the cells that aren't currency. Select cells A6 through A15, and format them as dates, then format cells B6 through B15 as text and cells L6 through L16 as numbers.

You also need to enter the constants in your form. In our sample, we have one—the company's mileage allowance. Let's say that amount is 30 cents. Enter **.30** in cells M6 through M15. (You can use the AutoFill function [see the November 1995 *PC Novice*], or you can enter the amount in each cell manually.)

The Sum Function

Since we introduced formulas last month, we'll dive into the mechanics of adding formulas to your form.

Our expense report consists mostly of addition formulas as we total your expenses. Mixed in, however, is a multiplication formula (which calculates the mileage reimbursement by multiplying total miles by 30 cents). There's also a subtraction formula that subtracts any advance you received from the amount the company owes you.



Here's our expense report with formulas and sample data. Check your formulas by typing in this data to see if your form yields the same answers.

Most of these formulas are simple. The addition formulas, ordinarily quite lengthy, have been shortened by our use of the Sum Function.

Adding The Formulas

To give your spreadsheet the magic that makes it a time-saver, you need to enter the following formulas:

Cell	Formula
C16	**=SUM(C6:C15)** *(Adds the cells down the column categories.)*
D16	**=SUM(D6:D15)**
E16	**=SUM(E6:E15)**
F16	**=SUM(F6:F15)**
G16	**=SUM(G6:G15)**
H16	**=SUM(H6:H15)**
I16	**=SUM(I6:I15)**
J16	**=SUM(J6:J15)**
K16	**=SUM(K6:K15)**
L16	**=SUM(L6:L15)**
M16	**=L16*0.30**
N16	**=SUM(N6:N15)**
O16	**=SUM (C16:K16)+SUM(M16:N16)** *(Adds the expense category totals, leaving out column L, which is miles driven.)*
O6	**=SUM(C6:K6)+N6** *(Adds the expenses by rows. Columns L and M, which are for mileage calculations, aren't included.)*
O7	**=SUM(C7:K7)+N7**
O8	**=SUM(C8:K8)+N8**
O9	**=SUM(C9:K9)+N9**
O10	**=SUM(C10:K10)+N10**
O11	**=SUM(C11:K11)+N11**
O12	**=SUM(C12:K12)+N12**
O13	**=SUM(C13:K13)+N13**
O14	**=SUM(C14:K14)+N14**
O15	**=SUM(C15:K15)+N15**
O17	**=O16** *(Repeats the total from O16 under the Grand Total heading.)*
O19	**=O17-O18** *(Subtracts travel advance from the Grand Total of expenses, providing the amount due to you or the company.)*

After entering these formulas, save your spreadsheet because you'll want to keep it as a form. To ensure everything was entered correctly, begin entering figures. Use the information in our illustraton, and make sure your answers match. If they don't, double-check the formulas you entered.

#VALUE!

As you experiment with formulas, you may discover Excel's error values. The program displays an error value, which always begins with a number sign (#), when it cannot properly calculate the formula for that cell.

These values look like the following: #DIV/0!, #N/A, #NAME?, #NULL, #NUM!, #REF!, and #VALUE!. When you see any of these, double-check your formula. You're trying to do something illegal, such as dividing by zero, or are using numbers, arguments, or operands incorrectly.

NOTE: If you see the value #####, it means that the formula's result is too long to fit in the cell. Make the column wider, and the "error" message will be replaced with a calculation.

If you've entered your formulas correctly, your spreadsheet will have no trouble passing through the Accounting Department. We can't help you, however, if you've lost receipts or charged expenses that aren't covered.●

by Lori Beckmann Johnson

Quattro Pro 6.0

Protecting Spreadsheets With Data Security Features

6.0 FOR WIN

SPREADSHEETS

Sharing a PC with a fellow worker, family member, or friend? All too often in these situations, we find ourselves missing a valued file. It's particularly annoying to find that someone has seen the contents of a file that was not meant for prying eyes!

We've all been there before. It's smart to share a computer, especially if two people are working at the desktop at different times of the day. But do our spreadsheets have to be available to anyone who can boot up the PC?

Fortunately for those who don't think so, *Quattro Pro* 6.0 lets you "protect" your spreadsheets from viewing and editing by others. All you have to do is "tell" it that a spreadsheet is for your eyes only.

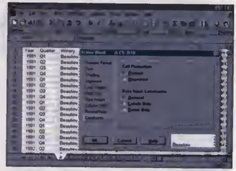
Protecting Cells

Quattro Pro lets you protect a cell or a group of cells from input. Here's how:

1. Open a spreadsheet, and select the cell(s) to be protected.
2. Click the right mouse button to display the Active Block dialog box.
3. Click Constraints to see more about protecting the cells you selected.
4. Click Protect.
5. Select the type of protection you want: **General** (protects all in the cell or cells), **Labels Only**, or **Dates Only**.
6. Click OK to finish.

When cells are protected, a user can't edit the cell's contents until protection is removed—and deleting the entire row or column won't let you get around the protection feature. You have to "unprotect" them first. To do so:

1. Open the spreadsheet.
2. Right-click to open the Active Block dialog box.
3. Click Constraints to see more about protecting the cells you selected.
4. Click Unprotect.
5. Click OK to finish.



Using *Quattro Pro's* built-in data security features prevents others from viewing and editing your data by placing passwords on entire spreadsheets or limiting access to specific cells.

Global Protection

OK. So we can protect a cell or cells from data entry. But what about the entire spreadsheet? Maybe you want to let others see a spreadsheet but limit what can be done to it. Quattro Pro lets you protect entire pages of your spreadsheet. **Page protection** works like cell protection, except that you can protect entire pages.

1. Open the spreadsheet.
2. Right-click the tab that represents the open page (located at the bottom of the screen) to open the Active Page dialog box.
3. Click Protection, then click the check boxes that represent either Cells or Objects. (**Cells** hold data; **objects** are pictures, graphs, and so forth.)
4. Click OK to finish.

This page of your file now is protected. To undo this protection, use the same set of steps, disabling protection as you go. This kind of protection is not absolute. Anyone with access to a protected file (or a file with protected cells and/or objects) can undo protection with this same knowledge. The only way to truly protect a file from others is to use a password.

Password Protection

While you can't password-protect a cell selection, you can password-protect a spreadsheet so that no one but the password's owner can open it. In fact, you can use password protection to limit file (and cell) use in three ways:

- To hide formulas while still displaying cell contents.
- To hide formulas and cell contents.
- To prevent the opening of a spreadsheet.

To enable these levels of password protection:

1. Open your spreadsheet.
2. Click the Property button at the upper-right of your screen. This opens the Active Notebook dialog box.
3. Click Password Level, then click the check box that represents Low, Medium, or High password protection.
4. Enter a password in the resulting text box.
5. Enter the same password again to verify.
6. Click OK to finish.
7. Close the file, and test the password.

Quattro Pro requires that you open a password-protected file at the Low or Medium protection levels when you reopen Quattro Pro. Use the following command from any Run dialog box (such as the one found on Program Manager's File menu or Windows 95's Taskbar):

qpw *<filename>* /s *<password>*

where *<filename>* is the actual name of the password-protected file, the /S indicates that the password to follow is the one that will open the file, and *<password>* is the actual password. If Quattro Pro won't run, you'll have to add the path to Quattro Pro's Qpw.exe file through the Run command. This is the only way to reopen a password-protected file saved with Low or Medium protection. If you set the password protection to High, you must enter the password when you open the file from Quattro Pro's File menu.

Most folks select the High option because it's less hassle when you reopen the file. Any way you cut it, Quattro Pro takes data protection seriously. We recommend trying password protection on a useless spreadsheet file while you're getting used to using password protection at the Low and Medium levels. If you goof, you can try again with nothing lost! ●

by Robert Mullen

WordPerfect 6.1

Working With TextArt

Word processing has evolved from dull to dazzling with the addition of a variety of graphics features. With a few clicks of the mouse, you can make your documents come alive.

For those not content with importing ready-made graphics from clip-art programs, there are more creative outlets. One of these is TextArt, a program included with *WordPerfect for Windows* 6.1, which lets you enhance text with special effects such as drop shadows, colors, shapes, and fills.

Stylizing Text

To add an artistic piece of text to your document, move the cursor to where you want the element to appear. Select TextArt from the Graphics menu, or click the TextArt button on the toolbar. (WordPerfect will identify each toolbar button when you pass your cursor over it.)

A graphics box filled with the word "TEXT" will appear in your document. The WordPerfect menus, power bar, and toolbar will be replaced with a TextArt menu. A text entry box will be displayed in the upper-left corner, with menus for choosing fonts and font styles.

Type the text you want to stylize. It will appear in the text entry box and graphics box and can be modified using the menus and toolbar. Your text is not confined to a single line; pressing ENTER will advance to a new line. To enter a special character, such as a copyright symbol, click the Character Select button on the toolbar. Select your symbol from the resulting dialog box, and choose Insert or Insert and Close.

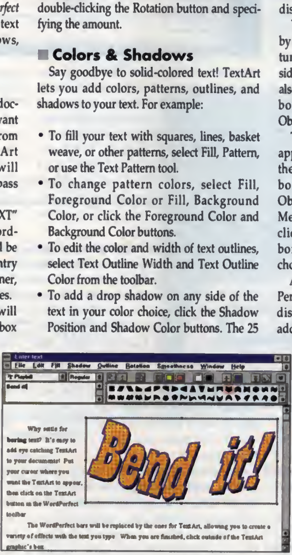
A dramatic way to change the look of your text is to curve its shape using one of the 38 shapes displayed just below the toolbar. The first shape is a square and results in text in a straight line, while the other shapes bend your text to fit the shape you select. Simply click one of the shapes to see its effect.

The justification of your text may change the way it looks when it is bent to fit a particular shape. Click the justification tool, and select left, center, or right justification. You also can rotate the text, although some rotations make the text hard to read. Choose Rotation, Show Rotation Handles, or click the Rotation button in the toolbar. Click and drag the handles that appear on your graphic to rotate it. You can specify the exact degree of rotation by selecting Rotation, Rotation from the menu or double-clicking the Rotation button and specifying the amount.

Colors & Shadows

Say goodbye to solid-colored text! TextArt lets you add colors, patterns, outlines, and shadows to your text. For example:

- To fill your text with squares, lines, basket weave, or other patterns, select Fill, Pattern, or use the Text Pattern tool.
- To change pattern colors, select Fill, Foreground Color or Fill, Background Color, or click the Foreground Color and Background Color buttons.
- To edit the color and width of text outlines, select Text Outline Width and Text Outline Color from the toolbar.
- To add a drop shadow on any side of the text in your color choice, click the Shadow Position and Shadow Color buttons. The 25 shadow positions include an option with no shadow.


Enter text
File Edit Fill Shadow Outline Rotation Smoothness Window Help
Playbill
Regular
Bend it!

Why settle for boring text? It's easy to add eye catching TextArt to your documents! Put your cursor where you want the TextArt to appear, then click on the TextArt button in the WordPerfect toolbar.

The WordPerfect bars will be replaced by the ones for TextArt, allowing you to create a variety of effects with the text you type. When you are finished, click outside of the TextArt graphic's box.

***WordPerfect*'s TextArt program lets you add colors, shadows, and patterns to documents without requiring separate graphics and clip-art applications.**

Sizing Graphics

Resize the TextArt graphic by clicking and dragging the corner resizing handles until the graphic is the desired size. Move the graphics box within your document by clicking and dragging one of its edges. When you're satisfied, click in the document outside the graphics box. Its outline will disappear.

You can further modify the TextArt graphic by double-clicking the graphics box, which returns you to the TextArt program. Click outside the graphics box when you're done. You also can edit the graphic by right-clicking the box and choosing TextArt 2.0 Document Object, Edit from the resulting QuickMenu.

To edit the TextArt graphic in a separate application window, which lets you enlarge the image for easier editing, right-click the box and choose TextArt 2.0 Document Object, Open from the resulting QuickMenu. To return to the document, double-click the TextArt window's Control-menu box, or click the Control-menu box and choose Close.

As with other graphic objects in WordPerfect, you can right-click the graphics box to display a QuickMenu with options such as adding a decorative border or a descriptive caption or using Image Tools to further enhance the graphic.

You can save your TextArt graphic as a WordPerfect Graphics (.WPG) file for use in other documents or other applications that can import WordPerfect graphics. To do so, click the graphic box. Select File, Save As, and choose Selected Image. Enter a file name for the graphic, and choose OK. You also can copy the graphic to the Clipboard by selecting Edit, Copy. ●

by Diane K. Walkowiak

Quicken Deluxe 5.0

Managing A Household Budget

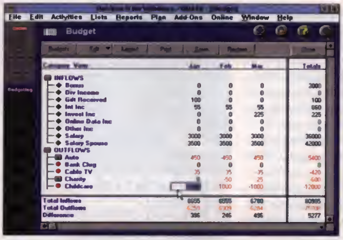
5.0 FOR WIN

PERSONAL FINANCE

If you're like most people, this is the time of year when all of the bills from your last-minute flurry of Christmas gift spending finally accumulate. Maxed-out credit cards and dwindling bank accounts are the aftermath of your final attack on the local mall.

And, if you're like most people, this is the time of year when you vow to be better prepared next Christmas by limiting yourself with a budget. Setting up a year-long budget is not only a good way to set aside money for gifts, but it can help you plan future high-cost projects, such as a new car or a kitchen remodeling.

Budgets also can be a complicated hassle, though. Tracking each dollar you spend and then correlating it to the correct category—all by hand—are tasks designed for only the most patient accountant. It requires plenty of additional time and effort on your part. But if you're using *Quicken*, the financial-tracking program from Intuit, you're already doing much of the work required for creating a budget.



Category View	Jan	Feb	Mar	Totals
INFLOWS				
Bonus	0	0	0	2000
Div Income	0	0	0	0
Gift Received	100	0	0	100
Int Inc	55	55	55	660
Invest Inc	0	0	225	225
Online Data Inc	0	0	0	0
Other Inc	0	0	0	0
Salary	3000	3000	3000	36000
Salary Spouse	3500	3500	3500	42000
OUTFLOWS				
Auto	-450	-450	-450	-5400
Bank Chrg	0	0	0	0
Cable TV	-35	-35	-35	-420
Charity	[illegible]	-50	-25	-600
Childcare	[illegible]	-1000	-1000	-12000
Total Inflows	6655	6555	6780	80985
Total Outflows	-6259	-6309	-6284	[illegible]
Difference	396	246	496	5277

With *Quicken's* Budgeting feature, it's easy to establish a budgeted amount for each expense category, track your spending, and see where you're over budget. The Budgeting feature also lets you track a variety of income sources.

Living On A Budget

To enter Quicken's Budgeting feature, click the Budgeting icon at the Quicken HomeBase. If you have a few months of information already entered into Quicken's electronic checkbook (and you've faithfully labeled each of your transactions with a category listing), creating a realistic budget will be easier because Quicken can help you. If you're starting from scratch, you'll have to use your best guesses for the various categories. No matter what your starting point is, you probably will need to adjust the budget during the first few months.

Let's first look at creating a budget based on transactions you've already entered. After entering the Budgeting window, click the Edit button, and select the Autocreate command. In the Automatically Create Budget window, you can choose the inclusive dates Quicken will use to create your budget. Click the calendar icon to change the dates. You can choose to have the transactions for the entire period averaged, or you can have each month treated individually. Click the Categories button if you want to edit the categories included in your budget. Remove the check mark from a category to remove it from the budget; add a check mark to include a particular category. Click OK when you're ready to have the budget automatically created.

Quicken will overwrite any previous budget you had created. If you'd like to return to the original budget, click the Restore button; to save the Quicken-created budget, click the Save button.

To create a budget from scratch using your own figures, simply find the category and month for which you want to enter a figure, click the zero, then type the figure you want to use. If you want to copy a figure from one monthly column through each of the upcoming month columns, highlight the figure, click the Edit button, and choose the Fill Row Right command.

Each month is listed along the top of the window, while each category is listed down the left side. Income-related categories (called **inflows**) are labeled with a green diamond, while expense-related categories (called **outflows**) are labeled with a red circle. If a category is labeled with a square containing a plus mark, you can click the square to gain access to its subcategories. Black numbers identify credit figures, while red numbers identify debit figures.

The total amount budgeted under each category is listed along the right side of the window, while the total inflows and outflows for each month and for the year are listed along the bottom of the window. You can see only three month columns at a time; click the scroll bar at the bottom of the window to see additional month columns. If you'd rather view your budget by quarters or if you'd rather not view empty categories, click the Layout button and make your desired changes.

Checking The Results

To see how closely you're following your budget, you can create a report or a graph. From anywhere in the program, click the Reports menu, and select the Graphs command. In the resulting menu, select the Budget Variance command. Then, in the Create Graph window, select the dates you want the graph to include, and click the Create button.

The graph will compare the income you expected vs. the income you actually received in the upper half of the window, and it will show the actual spending in each category vs. the budgeted amount in the bottom half of the window. Quicken's colorful graphs make viewing your spending tendencies extremely easy. ●

by Kyle Schurman

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Upgrading Your Flash BIOS For Plug And Play

j. cOdr

"How sweet it is" when you turn on a computer and everything behaves as it should. Considering how many glitches could occur, it sometimes seems amazing that a system starts up at all. Take, for example, your computer **BIOS**, pronounced "bye-ohs." When you power on the CPU, it needs something to take inventory of system hardware and prepare various installed components for work. This "something" is stored as programming code in the BIOS. Without it, the CPU doesn't know how to control basic hardware operations (such as disk reads and writes or interactions with the keyboard and hard drive). Similarly, without BIOS code, the CPU can't communicate with the system clock or video board. (BIOS, or Basic Input/Output System, is a routine stored in ROM that controls communication between the PC and its hardware.)

BIOS programs typically are stored in ROM (read-only memory) chips located on the motherboard because information stored in conventional RAM (random-access memory) disappears when you power off a computer. When you turn on your computer, the BIOS version number is often one of the first messages that appears on-screen. For example:

AMIBIOS (C)1992, American Megatrends, Inc. BIOS version 1.00.12.AX1T

Software developers frequently use and build upon data stored in the BIOS when designing programs. So, if the BIOS in your computer has a bug or lacks initialization code for a new peripheral, you may have to replace it. That's why a BIOS date and version number are so important.

A particular BIOS can significantly impact PC performance. Two hardware-identical machines might exhibit totally different personalities with different BIOS **firmware** (the software permanently stored in hardware chips). For example, in 1993, Gateway 2000 (a leading manufacturer and direct marketer of PC-compatible systems) confirmed that some of its local bus systems with a particular BIOS had problems running certain memory-resident applications. BIOS in these systems used an area of memory reserved for communication between applications. If users ran applications that occupied this part of memory, they were forced to reformat their hard drives. A corrected BIOS eventually was built into Gateway's newer models, and the problem disappeared.

In The Beginning

The collection of BIOS programs stored in ROM determines how your computer starts up. It performs the same set of routine operations every time. According to Mark Minasi in "The Complete PC Upgrade and Maintenance Guide," these steps are pretty much as follows: When you power on a computer, programming code in the main system BIOS determines which hardware is installed. The built-in program checks if this hardware is working. Then it searches for other BIOS-like programs installed on add-on boards in your system. If it recognizes any, it yields control of the system to those BIOS programs so that they can do their initial inventory and tests. When expansion board BIOSes have completed their startup routines, the main system BIOS continues with its tests, checking the computer's low memory and initializing those components it's designed to control.

Most of these operations occur very quickly, without users being aware of them. Sometimes, however, you do notice a particular stage in the BIOS **POST** (power-on self-test). For example, since a VGA controller adapter typically has its own BIOS chip, the software contained in video board ROM runs before the main system BIOS. As a result, you may notice a video board sign-on message before the main system BIOS copyright notice, date, and version number appear on-screen. When the main system BIOS tests low memory, a memory test message appears. When it inventories the hard drive, diskette drives, and keyboard, lights flash on those devices.

Once preliminary tests are complete and everything checks out, the BIOS pulls up additional information by loading the operating system into memory. It then reads a series of small boot files from the active drive (usually drive C:, the hard drive). Operating system software and boot applications take over from there.

The First Steps

When you purchase a computer, its BIOS firmware knows how to work intimately with your system's installed hardware components. To add new components (e.g., a large 1.2 gigabyte [GB] drive) to an older PC, you may have to upgrade your system BIOS so it can recognize drives with more than 1,024 cylinders. Computers manufactured in the early 1980s require a BIOS upgrade to use an EGA board, hard drive, local-area network card, or any ROM-equipped expansion board. Similarly, if you installed Windows 95 and want your computer to use the Plug-and-Play features of the operating system to manage installed peripherals or to recognize new peripherals that you add later, you must upgrade to a BIOS with built-in Plug-and-Play features.

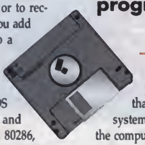
Some BIOS upgrades require removal of the old BIOS chip from your motherboard and replacement with a new one. 80286, 80386, and 80486 machines typically have two BIOS chips rather than one. Pentium systems, on the other hand, store BIOS on a special kind of memory chip called **flash RAM**. With flash RAM, users don't have to replace any motherboard chips for a BIOS upgrade. They simply run a BIOS update program and let the software perform the modifications. While making these changes doesn't require much skill, an incorrectly installed flash BIOS will prevent the computer from starting up, so pay very close attention to update instructions that ship with the software.

In recent months, Gateway 2000 issued flash BIOS updates to integrate Plug-and-Play capabilities in its P5-75 through P5-100 systems and its P5-60 and 66 Rev 3 and 4 motherboards. The newest Gateway Pentium systems have Plug-and-Play BIOS revisions already installed. To add improved Plug-and-Play capabilities to a P5-90 system, for example, your system must have BIOS version 1.00.12.AX1T. In this article, we'll show you how to upgrade your flash BIOS for Plug-and-Play capabilities.

There are a couple of precautionary steps to take before you can safely update a system's flash BIOS. First, check with Gateway's technical support (800/846-2301) to inquire which BIOS version your computer should be running. You don't want to download or install the wrong BIOS. The technician will want to know which Pentium motherboard is installed in your computer. You'll find this information on the packing slip that shipped with your system.

Second, power on the computer and watch the screen for the message that tells you how to enter your computer's Setup program. On a machine with an AMI (American Megatrends Inc.) BIOS, you might have to press DELETE or F1 at startup. On a computer with a Phoenix BIOS, you may have to press CTRL-ALT-ESC. Other computers use different methods to access their Setup programs.

Make sure you run the Setup program and write down all CMOS information.



A built-in Setup program is that portion of your computer's BIOS that lets you determine several of your system's basic characteristics. It also tells the computer which type of diskette and hard drives are installed, the system bootup sequence (i.e., the drives the system checks when it looks for the operating system), serial and parallel port addresses, and more. This vital configuration information is stored in a special memory chip called CMOS (pronounced "see-moss"). Since CMOS memory is volatile, the chip must be connected to a working battery to retain information. If the battery fails, CMOS data dissolves, causing you to see either an "Invalid Configuration" or "CMOS Failure . . ." message at startup.

Since updating the BIOS might accidentally modify or erase working CMOS settings, make sure you run the Setup program and write down all CMOS information, noting the settings for equipment installed in your system. Alternatively, document your computer's CMOS by moving through each CMOS screen display and pressing PRINT SCREEN.

Issuing a Print Screen command from the keyboard outputs a hard copy of the computer's current screen display. This approach is more reliable than jotting down hand notes because it eliminates the possibility of user error. Be sure to print settings for both Standard (Main) and Advanced CMOS configurations. If a problem occurs later on, you can re-enter the Setup program and use the printout to reconfigure those settings.

Getting BIOS Update Files

If your computer doesn't have a modem, call Gateway's Customer Service (800/846-2073) to ask about obtaining a BIOS update on diskette. If your computer is equipped with a modem, you can get updated BIOS files by calling the Gateway 2000 Download Service (800/846-7562). Files may be downloaded free of charge, but you'll need to download the data onto a bootable, high-density system diskette. Depending upon the version number of the BIOS currently installed in your computer, you even may need to perform two BIOS updates. So, before you call the Gateway 2000 Bulletin Board System (BBS), prepare two bootable system diskettes in the following way:

1. Place the diskette you want to format in drive A:.
2. Double left-click Win95's My Computer icon.
3. When the window opens, left-click the icon labeled 3 1/2 Floppy [A:].
4. Choose Format from the File menu.
5. Select Full from Format Type, then check Copy System Files from the Other Options menu.
6. Left-click Start.

Repeat the procedure to format a second diskette. When you have two bootable diskettes, call the Gateway BBS.

To update via modem, follow these steps:

1. Use your modem to dial the Gateway BBS.
2. At the screen prompt, choose a language/protocol (e.g., press **1** for English/ANSI, the standard English language version), then press ENTER.
3. Log in with the user ID **guest**.
4. Press **L** to access Gateway's driver library.
5. When the Driver File Download Library appears, choose 2 for Motherboard Utilities.
6. From the Motherboard Utilities menu, choose 5. . . Flash BIOS Updates For All Systems.
7. After the Flash BIOS Update Menu appears, choose the update for your particular system. For example, if you are running a P5-90 with a P54C Plato motherboard, select C . . . P5 (1.00.12.AX1T) BIOS to add Plug-and-Play capabilities in your main system BIOS.

(NOTE: If your current P5 BIOS version number is 1.00.09.AX1, you cannot update to

1.00.12.AX1T directly. First, upgrade your BIOS from 1.00.09.AX1 to 1.00.09.AX1T, then move up from 1.00.09.AX1T to 1.00.12.AX1T.)

Both procedures are essentially the same. For a two-stage BIOS update, follow these steps:

1. When the Flash BIOS Update Menu displays, choose B . . . P5-90 Flash BIOS (1.00.09.AX1T). A message appears stating that you'll be downloading a self-extracting file containing the BIOS update AX1T for P5-90 systems. This update will work only on systems with the BIOS revision 1.00.09.AX1 and prior .AX1 revisions. Once your system has been flashed with this version, it isn't possible to return to an earlier version.
2. You're now ready to download the first BIOS update. Verify download settings for your telecommunication program. Since you are going to download a file that could have adverse effects on your system if executed incorrectly, you want to ensure that your download directory is set correctly.
3. Choose a download option (e.g., Z for the Z Modem transfer protocol).
4. Press ENTER to begin the download process.

Each BIOS update transfers to your download directory as a self-extracting archive.

When you've finished downloading the 1.00.09AXIT update, you're ready to download the second file.

1. Choose C . . . P5 (1.00.12.AX1T) BIOS (updates for .AX1T BIOS only).
2. A notice tells you this file is an updated BIOS for the P5-75, 90, and 100 BIOS and that users must first upgrade to 1.00.09.AX1T before using this update. While you haven't yet upgraded to 1.00.09.AX1T, you have already downloaded the archived file, so you're all set.
3. Choose a download protocol (e.g., Z for Z Modem), then press ENTER to initiate the download process.
4. After the 12ax1t.exe transfer is complete, the computer returns to the Flash BIOS Updates menu. Press ALT-F4 to quit and disconnect. You also can type X, then press ENTER to exit. Repeat the X/Enter procedure three more times, then type Y in response to the flashing message that advises you are about to terminate your connection. Pressing Y automatically disconnects your modem from the Gateway BBS system.

Updating The BIOS

Each BIOS update transfers to your download directory as a self-extracting archive. To install these updates, proceed as follows:

1. Place the first bootable diskette in drive A:, then copy the P5ax1t.exe application to that diskette.
2. Double left-click drive A: to verify that a copy of the file now resides on the diskette. If you see an icon labeled P5ax1t.exe, you're ready for the next step.
3. Drag the original P5ax1t.exe archive file from the download directory on your hard drive to the Recycle Bin.
4. Right-click the Recycle Bin, then choose Empty Recycle Bin to delete its contents.
5. Return to drive A:, and make it active by left-clicking the drive A: icon.
6. Double left-click the P5ax1t.exe file icon in drive A:. The archive automatically self-extracts, copying its contents to the diskette. Scroll through the files to see what's there, making sure to read .TXT files for installation instructions.
7. Leave the diskette with the P5AX1T files in drive A:, then restart the computer.
8. Follow on-screen directions. After completing all steps, reboot once more, and a new BIOS copyright message will display on-screen.

You're now ready to perform the second BIOS update.

1. Place the second bootable diskette in drive A:.
2. Copy the 12ax1t.exe file from the download directory on your hard drive to the startup diskette.
3. Double left-click drive A: to verify there is a copy of the archived file. If you see an icon labeled 12ax1t.exe, you're ready for the next step.
4. Drag the original 12ax1t.exe archive file from the download directory to the Recycle Bin, then empty the bin to delete its contents.
5. Return to drive A:, and make it active by left-clicking the drive A: icon.
6. Expand the 12ax1t.exe archive as you previously expanded the P5ax1t.exe upgrade archive. Remember to print out and read the Readme.txt files for installation instructions.

When the computer restarts with the second bootable flash BIOS diskette in drive A:, the Flash Memory Update Utility screen appears. Press ENTER to continue and follow these steps:

1. After the Main Menu appears, use the down arrow key to highlight the option labeled Update Flash Memory Area From A File. Then press ENTER to continue.
2. When the Update Flash Area window appears, Update System BIOS should be highlighted. If it isn't, use the down arrow key to scroll to this option and highlight it. After it's highlighted, press ENTER.
3. When the Enter Path/Filename window appears, use the down arrow to highlight 1012ax1t_.bio in the Files box. Press ENTER.
4. When the Verify Image window appears, make sure that Continue With Programming is highlighted, then press ENTER.
5. Finally, after the "Continue" message appears, remove the bootable flash diskette from the diskette drive, then press ENTER. The system will reboot, displaying the message "BIOS Version 1.00.12.AX1T".

To ensure that the CMOS settings are still correct, enter the CMOS configuration setup at system startup, and check the settings against your printed copy. If there are any discrepancies, modify the settings to match the printout. Be sure to save changes when you exit.

Troubleshooting

If you inadvertently expand the archived BIOS upgrade files in the download directory, do *NOT* execute any BIOS program applications from your hard drive. If you do, you'll trash your computer's CMOS settings, which then must be reconfigured manually from the emergency printout you created earlier. In addition, you might trash a crucial operating system file, prompting a startup error message that reads "Bad or missing Sys file" or "Non-system disk". If this message appears, insert the Win95 Emergency Start Disk in your boot drive (drive A:), restart the computer, then type in the following command at the C> prompt:

```
sys a: c:
```

The SYS command transfers Io.sys and Msdos.sys (crucial DOS operating system files), as well as the Command.com file, to your hard drive without requiring reformatting. Once this transfer is complete, you can safely reboot. Everything should be back to normal. ●

by Carol S. Holzberg, Ph.D.

Having It Your Way Using DOS Batch Files

As you dig about into the world of personal computing, you no doubt run across the term "batch file" from time to time. While most people don't use **batch files** to their full potential, those same people are using one special batch file to start their computers: Autoexec.bat. This crucial batch file, like all others, contains a series of commands that the operating system will carry out for you, one command at a time. The length of the command list varies depending on the file.

■ Your Computer Knows . . .

The secret to batch files (as far as DOS is concerned) is that DOS considers a file with a file name extension of .BAT to be an **executable** file, just like a file with a file name extension of .EXE or .COM. (An executable file is any file that DOS thinks is really a program and can be executed. When you run your word processor, you usually "execute" a file that has a file name extension of .EXE or .COM.) DOS believes that files with this file name extension are programs waiting to run. Batch files, too, are executable programs since DOS includes files with a file name extension of .BAT in its executable thought process.

This hidden power of DOS can be harnessed to your benefit with a bit of knowledge and a simple text editor program like the one that comes free (Edit.com) with later versions of MS-DOS.

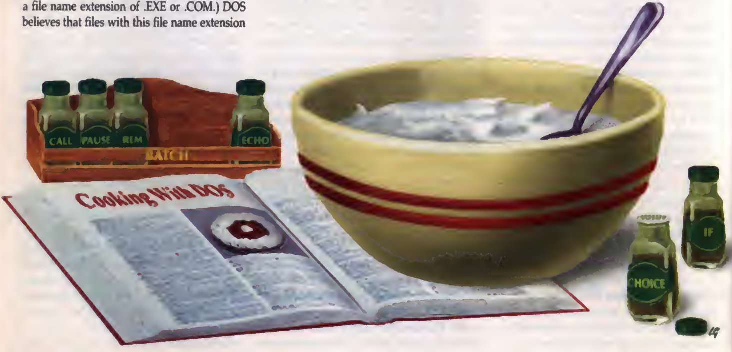
What does all this "power" mean to users? You can make your own, simple programs by listing DOS commands in a batch file. Batch files aren't just for those who prefer to work from the DOS command prompt. You can use a batch file to run a string of DOS commands and utility programs, then launch Windows, your favorite Windows application, and open a file native to that application . . . all with a single batch file.

The first batch file to be created for most computers in the early 1980s is still one of the two files that are run when your computer powers up. One of these startup files, Autoexec.bat, runs a list of DOS commands and utility programs for you as though it were a small program in itself.

For the sake of clarity, you should know there are basically two kinds of batch files: those that have the file name Autoexec.bat and those that don't. DOS will consider any file named Autoexec.bat as a startup file, and that batch file will be run whenever you restart your PC (it's located in your hard drive's root directory).

Any other batch files aren't run automatically at system startup. You must type the name of the file at the DOS prompt, then press ENTER to run the batch file as if it were a program.

While this article won't get into programming as most of us think of it today, we are going to show you how to use a batch file to



make your computer act as though it's running a simple program, created entirely by you. What can you do with a batch file? Batch file programs can be used to change the color of your display's screen, maintain your computer's hard drive, or replace a lengthy command, like that used to format a high-density diskette as a single-density diskette for use on older computers.

You also can use batch files as your own, private menu programs. You can make a batch file that will display a list of options on your screen (such as your favorite programs), then you can enter a letter or number to run one of the programs displayed on the list without having to memorize any commands or the locations of those programs on your hard drive.

You can use any DOS command or utility program name that you would normally use at the command prompt in a batch file. Other commands are made just for use in batch files, but their explanation and use can get somewhat complex, so we'll skip their use on these pages. Let's check out a few commands that have been created especially for use in batch files:

CALL. This command lets you run a batch file from within another batch file. For example:

```
Echo off
Set Temp=C:\TEMP
Call Copy.bat
Win
```

This batch file tells your monitor to save you from the boredom of reviewing the details of running programs. It then establishes a place for your computer's temporary files to be stored and runs a second batch file that copies your data files to a safe place. Finally, it runs Windows for you.

When you use the CALL command, another batch file is run. Once the second batch file is run, the first file containing the CALL command returns to running whatever commands followed the CALL command. For example, you might want to make a batch file that specializes in running a set of programs that are only used when you use your favorite word processor. You may not want to take up your computer's memory running a spell checker or a print spooler unless you're using your word processor. The CALL command lets you launch sets of programs that are only needed if you, say, select a menu item from your menu batch file.

One more thing about the CALL command: When a "called" second (third, etc.) batch file is done "doing its thing," the second batch file returns control of your computer to the original batch file. If you use the CALL command to run a second or third batch file, you don't have to run your menu program again once the "called" batch file is no longer in use. The original batch file containing the CALL command is still effectively running in the background, so to speak, keeping your menu alive and well.

Figure 1: This batch file lets you start your word processing program, such as *Word for DOS*, and the SCANDISK utility in addition to a few other odds and ends.

```
@echo off
cls
rem My Menu
echo;
echo;
echo Please Choose An Option
echo;
echo (1) Run Word for DOS
echo (2) Run DOS Shell
echo (3) Erase Junk Files
echo (4) Run Scandisk
echo;
choice Choose an option /c1234
if errorlevel 4 goto 40
if errorlevel 3 goto 30
if errorlevel 2 goto 20
if errorlevel 1 goto 10
:10
c:\word\word.exe
goto end
:20
c:\dos\dosshell.exe
goto end
:30
erase *.tmp
goto end
:40
c:\dos\scandisk.exe
:end
c:\menu.bat
```

IF. This command lets your batch file do different things based on conditions that exist, such as the existence of a file. Check out the use of this command in the sample batch file that makes a menu for you, found later in this article.

CHOICE. The CHOICE command lets you choose between different options presented to you, such as items on a menu that you've created with a batch file.

PAUSE. This command tells your computer to wait until a key is pressed before continuing. When a batch file executes DOS' PAUSE command, you'll see this message displayed:

"Press any key to continue . . ."

ECHO. This command displays any text that appears on the same line after the ECHO command. The word ECHO isn't displayed, however. You change this display of text by adding the words "on" or "off" after the ECHO command, on the same command line.

REM. The REM command lets comments be kept in the batch file for the batch file author's eyes only. These "REMmed" comments aren't displayed on-screen.

Your First Batch Files

Let's make a batch file that looks like a simple menu program. We'll do this entirely with DOS commands and DOS' built-in text editor, called EDITOR. If you have DOS 5.0 or newer, you have all you need. Of course, some assembly is required.

Here's the premise for the batch file we're about to make: We want to avoid typing commands. When our computer powers up, we want to merely select from a list of options in a menu presented to us. We want our programs to run at the drop of a single keystroke, so let's get started.

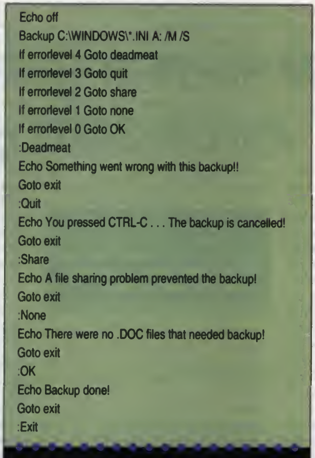
To create your first batch file, you must start the DOS EDITOR by typing **edit** at the command prompt. When the EDITOR starts, you'll be presented with an option for extra help. Press ESC to skip this offer. Now, you'll see a screen that's mostly blank, with a menu displayed across the top of the screen. The cursor will be flashing at you from within a large box, with the word Untitled appearing at top-center of the box. Select Save As from the File menu to save this empty batch file as Menu.bat.

Make sure Menu.bat is located in the root directory of your hard drive, just to keep things simple for now. Now EDITOR should be displaying an empty box entitled Menu.bat. You've made your first batch file.

Let's fill this batch file with the commands needed to create a menu to be displayed on-screen. This menu will let you run *Word for DOS*, a DOS shell program, and will erase temporary files and run SCANDISK, the DOS utility that fixes errors on your hard drive. That's four programs that will be run from Menu.bat.

Let's switch back to our EDITOR program, and type in the following text, exactly as you see it in Figure 1 on the previous page. (*NOTE: For future reference, it doesn't make a difference whether you type the commands in upper- or lowercase in a batch file.*)

This batch file lets you launch your word processing program, run the DOS shell program to give you access to the files on your hard drive, delete all useless temporary files, and run the DOS SCANDISK utility to fix any errors on your hard drive as part of your weekly PC maintenance routine.



```
Echo off
Backup C:\WINDOWS\*.INI A: /M /S
If errorlevel 4 Goto deadmeat
If errorlevel 3 Goto quit
If errorlevel 2 Goto share
If errorlevel 1 Goto none
If errorlevel 0 Goto OK
:Deadmeat
Echo Something went wrong with this backup!!
Goto exit
:Quit
Echo You pressed CTRL-C . . . The backup is cancelled!
Goto exit
:Share
Echo A file sharing problem prevented the backup!
Goto exit
:None
Echo There were no .DOC files that needed backup!
Goto exit
:OK
Echo Backup done!
Goto exit
:Exit
```

Figure 2: The above batch file checks whether you've made any changes to your .INI files since the last backup.

All you have to do is substitute your own text for the selections you wish to make on the "echo" lines, then change the name, path, and program names of the programs themselves. Make sure that the programs you want to run are properly identified, or you'll get a DOS error message saying "Bad command or filename."

For example, if you want to run another word processing program instead of Word for DOS, substitute the name of that program on the menu, then change the text "c:\word\word.exe" to the location and program name of your favored word processor. Of course, you could substitute **win winword** if your preferred word processor were *Microsoft Word for Windows*. The menu doesn't care which program or command you run. It just needs the correct location and file name to run. You can use this menu program to run any command that can normally be run from the DOS prompt. You even can run other batch files as long as you place the command **call** before the name of the batch file on the same command line, such as **call copy.bat**. You also can add more options to your menu, such as the ability to move directly to a DOS prompt so you can run another DOS command or program.

If you know how to use DOS commands, you already know how to make batch files. You can use batch files to format diskettes, copy diskettes, literally do anything that DOS can do with a single DOS command or a set of DOS commands that run in sequence.

Formatting diskettes. Formatting diskettes is one of the first things you should learn when you use a personal computer. MS-DOS will format a diskette at the rated capacity of the drive you designate, unless you tell DOS otherwise in the same statement you use to format the diskette. You use the Format.com utility included with MS-DOS to format all diskettes and your hard drive(s).

Many of us need to format the double-sided, double-density diskettes in our high-density drives in order to reuse the once-popular 720 kilobyte (KB) 3.5-inch diskettes. (These are the diskettes that don't brandish the letters "HD.")

Here's an example of a simple batch file called Form720.bat that will format a double-density, 720KB, 3.5-inch diskette in a 1.44 megabyte (MB) high-density drive. Make sure the drive designation (in this case, A:) matches your system's drive address and that you can use this batch file:

```
Echo off
Format A:/F:720
```

This next batch file formats 360KB, 5.25-inch diskettes in a 1.2MB, high-density A: drive:

```
Echo off
Format A:/F:360
```

These two sets of commands, when added to a batch file, format low-capacity diskettes in high-capacity drives. If you already have low-capacity drives, MS-DOS knows this so you don't need to specify the /F **switch**. (A switch is a character added after a command that somehow customizes the way that program runs.) If your computer uses high-capacity diskette drives, you'll only need these batch files when you need to format low-capacity diskettes.

Moving files. If you only want to move files around on your hard drive, you'll find that DOS doesn't provide you with a utility program to get the job done so you'll need to create a batch file.

We'll show you how to make a batch file to do just that. This batch file's name will be Move.bat. This batch file moves only files with the file name extension .DOC from the diskette in your A: drive to the C:\DOC (in our example, anyway) directory on a hard drive. It also deletes the original files on the diskette with a file name extension .DOC without you needing to respond to the "Delete all Files? (Y/N)" question posed by MS-DOS. Here's what Move.bat should look like:

```
C:\DOC
Xcopy A:*.DOC
Echo YDEL A:\*.DOC
```

It's that easy. Change the names of the files, drives, or **wildcard specifications** to suit your individual needs, but the

Move.bat batch file does the job. (A wildcard specification is "*", and it lets you include all files that match the remaining part of the specification.)

Backing up. Here is a single line batch file for Windows users that that will help you do backups of all of your critical Windows .INI files using DOS' BACKUP program. This batch file believes that all Windows programs are located in subdirectories attached to your WINDOWS directory. Save this batch file with the name of Backup.bat.

The batch file in Figure 2 on the previous page checks to see whether you've made any changes to .INI files since the last backup by using DOS' IF function, which performs commands based on conditional statements, and only performs a backup of changed .INI files to drive A:.

When you run the batch file for the first time, you'll see a list of all of your .INI files as they are being archived to drive A:. Here's what happens when the Backup.bat batch file executes:

1. MS-DOS' Backup.exe reads the size, time, and date stamp of the first file that meets its search criteria. In this case, we specified .INI files only. Backup.exe ignores all other files.
2. Backup.exe checks the first (and succeeding) .DOC files it finds to learn if they've been backed up recently if a file doesn't exist on the target drive. The /M switch causes Backup.exe to back up these files.
3. The /S switch directs MS-DOS' Backup.exe to look at all files in every directory and subdirectory that reports to the current directory.
4. When Backup.exe considers each file that matches the file specification criteria, it displays a "message code" on your screen. The meanings of these codes can be found in Figure 3 on this page.

Look at another conditional use of "errorlevel". When you use this batch file (and you fail to place a diskette in drive A:), you'll get the DOS error message: "Abort, Retry, Fail?" If you select Fail, the message will continue to appear. If you select Retry (or R), the message will continue to appear. If you select Abort, Backup.exe will return the code 3. MS-DOS will interpret your choice as a being the same as the errorlevel 3 message (which is the equivalent of an abort) or pressing CTRL-C.

Because of this condition, your batch file will translate this "code" by virtue of the errorlevel function and the value of the code and will display the message you want to see in the event this particular code is indicated. That message is:

"Echo You pressed CTRL-C . . . The backup is cancelled!"

You can fool around with the text displayed by each "code." The last command in our batch file, ":Exit," doesn't really do anything except cause the end of the batch file's execution. When MS-DOS runs the last command line in a batch file, your DOS prompt will appear once again, and the batch file will no longer be running.

Troubleshooting

By using DOS' COMMAND /Y, you can step through a batch file line-by-line and can selectively bypass or carry out individual commands. For more information on how to do this, type **help command** at the DOS prompt.

Batch files, like our menu, are simple once you work with them a bit. The really confusing part (at first) can be trying to determine exactly which line is in error when trouble shows up. For the most part, any errors you find on your hands should be ones based on your typing. Misspelled commands and omitted numbers or letters will get you every time.

Once you get the basic mechanics of a batch file down, you'll want to add more power to your batch files. You can explore how the gurus do batch file programming by heading down to your local computer bookstore and finding a book on batch file programming.

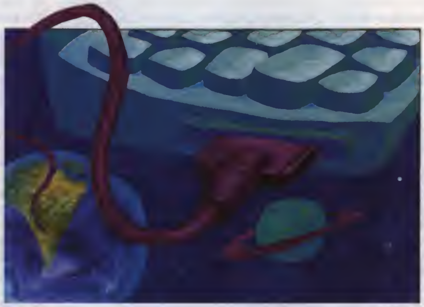
If you're careful, you should be able to modify and expand this simple menu batch file to create your own menus. You can place this Menu.bat at the last line in your Autoexec.bat file to ensure your menu batch file is run automatically on system startup. When your friends see your new batch file "programming" abilities in action, you may find you've earned a whole new respect with your peers. ●

by Robert Mullen

Code:	What It Means:
0	This file backup was completed.
1	No files needed to be backed up.
2	File-sharing conflicts caused this backup to fail!
3	You pressed the CTRL-C keys to quit.
4	Another problem caused the backup process to be interrupted.
5	The is where "errorlevel" comes in. Errorlevel is a condition. In the batch file, the second line reads like this: If errorlevel 4 goto deadmeat The preceding command line actually happens like this: "If the backup program posts a message (exit code 0 . . . 4), go to (goto) the line in the batch file that begins with the colon (:) and word ("deadmeat" . . . etc.) assigned to that message code and run that command line." In the case of the existence of the first condition (or code 4), MS-DOS goes to the line that begins with ":Deadmeat" and executes the next three lines: :Deadmeat Echo You pressed CTRL-C . . . The backup is cancelled! Goto exit
6	MS-DOS says the message that you instructed it to say in the event one of the conditions in the list above exists (in the case of our example, code "0") and then looks for and executes (goto) the line that begins with ":Exit".

Figure 3: This chart contains the meanings of the codes Backup.exe displays after it determines which files match the specified criteria.

New PC Cards Keep Portables Connected



If portable computers have taken PCs to the next level, then PC Cards have taken the genre to another universe. No longer are there just possibilities and potential for traveling computers; PC Cards (formerly called PCMCIA Cards after the Personal Computer Memory Card International Association) have made portable PCs fully capable outside the constraints of an office.

Today's **PC Cards** let notebook computer users connect to an office network, check E-mail on the road, fax a document from a hotel room to a co-worker or client, and much more with the quick insertion of credit-card-sized devices with various capabilities. According to market research estimates, there are 9 million telecommuters relying on portable communication, and the market is still growing.

Dataquest research indicates that the PC industry is striving to meet the PC Card demand. An estimated 86% of all mobile computers shipped in 1994 were PC Card-ready. These include notebook, subnotebook, palmtop, personal digital assistant, and personal communications models. Look for a trend toward PC Card slots in desktop machines and workstations. It's estimated that by 1999, there will be more than 39 million platforms with slots and even more if the market for pen-based products meets expectations.

PC Card development has come "incredibly far" in the past few years, says John Lynch, national sales manager for SCM Microsystems of Los Gatos, Calif. SCM, which began in Germany in 1990, was among the first to develop PC Card technology. "Two and half or three years ago, you were lucky if you found a modem with a PC, " Lynch says.

The idea behind PC Card development was to make a **bus** connector that could be used by a wide assortment of devices. (The bus is a set of wires that transfers data among computer components.) It began in 1989 when several industry-leading portable computer manufacturers were looking for a method of memory expansion for their computers. Diskettes didn't store enough data and couldn't stand up to the rough-and-tumble world of mobile computing.

In the beginning, memory expansion came mostly in flash memory cards for long-term storage of information, in humble amounts of five megabytes (MB) to 10MB. The next step was expanding the uses for PC Cards to modems, network cards, sound cards, **small computer system interface (SCSI)** adapters, cellular pagers, and just about anything else you can think of to plug into a desktop PC. (SCSI is a high-speed interface that lets PCs connect to up to seven peripheral devices.)

Andrew Prophet, founder of AP Research in Cupertino, Calif., a consulting and marketing firm for PC Cards and SCSI adapters, foresees rapid expansion in card development that will lead to a flood of new cards in 1997.

Prophet points out that card suppliers have largely concentrated in horizontal markets such as memory, mass storage, fax/modems, and networking. A few companies have branched out with SCSI cards, **ISDN cards**, multiple-function cards, sound cards, and a wide range of wireless cards. (**Integrated Services Digital Network** provides faster communication by transferring digital data over telephone lines.) Those who are really stepping from the ranks offer cards aimed at such vertical markets as health care, transportation, set-top boxes, inventory management, and wireless office networking.

Card Standards

All PC Cards are about the length and width of a credit card, but they differ in thickness.

A PC Card standard provides definitions for three types of PC Cards. All are the same length and width and use a 68-pin connector. The only difference is in the thickness. Type I cards are 3.3 millimeters thick, Type II are 5 millimeters, and Type III are 10.5 millimeters.

Typically, Type I PC Cards are used for memory devices such as RAM, Flash, and **SRAM** cards. (SRAM [Static RAM] is a fast form of RAM.) Type II cards, which have about 80% of the market, are generally used for fax/modems, local-area networks (LANs), and mass storage devices such as hard drives. Type II cards are used for devices with thicker components, such as rotating mass storage devices. There are also extended cords that allow the addition of components that must remain outside the system for proper operation, such as antennas for wireless communication.

In February 1995, the PCMCIA, the international standards body and trade association for

PC Cards, released the first major update to its standards since release 2.1 in 1992. The new standard, called CardBus, attempts to address current and future market needs. Low-voltage support, multiple functionality, **direct memory address (DMA)** support, and a power management interface all address the needs of a changing market. (DMA allows data transfer between memory and an "intelligent" peripheral without microprocessor involvement.)

CardBus features and capabilities include: 32-bit functionality; 33MHz operation; platform and operating system independence; bus master operations; backward compatibility; interface power management; 3.3 volts (or lower) operation; remote wakeup; dynamic reconfiguration; improved audio capability; and noncustomized, multifunction card support.

The backward compatibility means CardBus is an extension of current PC Card software capabilities. All CardBus sockets must be able to accept and operate PC Cards not utilizing CardBus within the capabilities of the system.

The uses for PC Cards have expanded dramatically along with the popularity of portable PCs themselves.

"The popularity of both is mutually inclusive," says Michael Jack, product manager for Ethernet token rings for Thomas-Conrad Corporation. "Most laptops or notebooks now have at least one or two slots for them. They expand the functionality of portables so greatly that most users would opt for a machine that includes PC Card capability no matter what the cost."

The demand for PC Cards is exploding, and consumers are benefiting. "When there is a market for something, the more devices become available," Jack says. "They are easy to install, easy to configure; you can take them in and out while the machine is running (**hot swapping**), and they are so versatile—they have the same capabilities as a desktop PC."

The future definitely lies in the CardBus, Jack says. Its 32-bit capabilities, for example, allow better-quality video presentation, he says.

"I think CardBus will be the de facto standard by the end of 1996 and will eventually take over the market," Jack says. "It will begin slowly, but it takes time to establish market dominance."

The PC Card is advancing from adolescence to adulthood. An explosion in product diversity is in the making, as is a move toward multiple-function cards. The large horizontal market will be dominated by low-cost producers, and the vertical markets will continue to be addressed by the small, more adventuresome manufacturers.

What's Available

Here is a quick look at what several major players in the PC Card world offer:

Thomas-Conrad. Called TC-Cards and built for Type II slots, these dynamos offer the option of high-performance rivaling that of full-sized LAN (local-area network) adapters and ship with drivers for **ODI- and NDIS-compliant networks**. (**Open data link interface** and **network driver interface specification** are standards popularized by Novell and Microsoft, respectively.) The idea is to combine ease of use, high-speed data transfer capacity, and compatibility so that your portable has full network function.

Thomas-Conrad has PCMCIA adapters available for token ring networks, **10Base-T networks**, and **10Base-2** networks. (10Base-T and 10Base-2 refer to standard cables used for large and small networks, respectively.) The 10Base-T and token ring adapters ship with extended length (three-meter) cables that feature lockable connectors.

For PCMCIA-capable machines that support remote program load (RPL), TC-Cards have RPL capabilities for select environments, allowing the use of diskless workstations. Thomas-Conrad boasts that its cards offer faster performance than that of pocket adapters and are equal to that of full-sized ISA adapters.

All TC-Cards meet Release 2.0 and higher of the PCMCIA specifications and are compatible with any computer equipped with a PCMCIA Type II slot. They also have drivers for OS/2 and DOS-based ODI and NDIS workstations for access to major network operating systems, including NetWare, LAN Manager, and LAN Server.

Installation is simplified by letting users select the environment in which the adapter will be used and by automatically configuring the adapter and copying the appropriate driver files.

Motorola. Motorola in 1995 formed a new division, called the PCMCIA Products Division, that will cater to the PC Card market. It won't replace the operations currently producing PC Cards, but it will develop new PC Card products in addition to coordinating common research, manufacturing, semiconductor, and market efforts within the corporation. In short, Motorola wants to be No.1 in the PC Card market, which it expects to grow to more than $8 billion in the next three years.

Motorola offers single- and multifunction products including modems, wireless modems, one-way messaging cards, video cards, and flash memory cards. Its Marquis is a 28.8 fax/modem card with a high-performance LAN adapter for personal computers with Type II slots.

The Marquis was designed for mobile PC users who need to add a LAN adapter and fax/modem capabilities to their machines. This frees remaining slots for other applications. The card's LAN structure optimizes speed and throughput by letting the LAN adapter overlap processing tasks. The PC Card can have a frame of data in system memory, on the adapter, and on the cable, all at the same time. Research for Motorola by LANQuest Labs indicates that the Marquis is 83% faster than competing cards in NetWare and LAN Manager environments. The

PC Cards, such as Thomas-Conrad's LAN adapters, let portable computers easily become part of popular Ethernet and token ring networks.

Marquis can be used on 10Base-T Ethernet networks.

The Marquis is easily installed. For Novell and NetWare LANs, a single menu choice will complete the installation in less than three minutes. A Windows-based, custom installation is available for other leading network operating systems, including Microsoft LAN Manager, Windows for Workgroups, Windows NT, Artisoft LANtastic, and Banyan VINES.

Marquis includes cables for LAN and modem, installation software, and device drivers. The fax/modem software includes such tools as broadcast and scheduling capabilities, automatic dialing, and answering functions.

Motorola's Montana PC Card is a 28.8 fax/modem that includes cellular connectivity and innovative wireless messaging for one-way and two-way paging systems. Portable PC users will have remote access to corporate networks, E-mail, the Internet, and wireless capabilities that provide connectivity to cellular phones and communications with the newest one-way, alphanumeric paging systems.

Today's pagers can store vast amounts of information (more than 100 pages of text) that can be unwieldy for viewing with the typical liquid-crystal display (LCD) on most pagers. With Montana, the user can download and review lengthy pager messages. Users also can send wire messages to other two-way paging subscribers; print, archive, cut, and paste pager messages on a computer; send alphanumeric messages through the modem; maintain a directory of frequently called numbers; and send broadcast messages to multiple paging subscribers.

Montana, which is Windows 95-compatible, has a dual connector that lets a computer and telephone share the same phone line, eliminating cable transfers between voice and data communications. Montana was expected to ship in February 1996.

Motorola's Mariner is a 28.8 fax/modem/LAN adapter that combines wireline and wireless capabilities in a PC Card. With the Mariner, users can send and receive data, access network resources (either 10Base-T or 10Base-2 networks), connect to leading cellular phone lines, send alphanumeric messages to Motorola pagers, download information from pager to computer, and use the modem and LAN adapter at the same time.

Mariner is for portable PC users who need a LAN adapter for the office, as well as a high-performance modem for remote access. It is Win95-friendly.

3Com. Yes, sports fans, the same company that usurped the Candlestick Park name for San Francisco's 3Com Park, claims its Ethernet PC Cards are as fast as any in the industry.

EtherLink III PC Cards come with parallel tasking so that separate tasks may be undertaken simultaneously. They install automatically through Win95's Plug-and-Play feature, and if you don't have Win95, the card automatically is configured.

The cards come with device drivers and cable for the PC Card and the modem on the LAN/modem cards. 3Com PC Cards support the new card standard and previous PCMCIA 2.0/2.1 specifications. And like Motorola PC cards, 3Com cards are up to 83% faster than most on the market, according to independent benchmarks by LANQuest Labs.

3Com PC Cards are among those on the market with power-saving features, lengthening battery life for portable PC users.

Actiontec. This line of PC Cards is suited for PC notebooks as well as Apple Powerbook computers. The company's PC Card products include fax/modems, Ethernet + fax/modem combo cards, Ethernet adapters, SCSI adapters, and desktop card bays.

ActionTec bundles its PC Card products with software. For example, ActionTec's fax/modems and combination adapters ship with a complete fax/modem communications package, *LapLink for Windows* remote access and file synchronization software, *Borland Sidekick* personal organizer, *SPRY Mosaic* Internet software, and a full suite of online service provider packages.

The Powerbook PC Cards for Apple's new Powerbook series 5300 and 190, the first to include built-in PCMCIA slots, include DataLink Fax/Modems, ComNet Fax/Modem + Ethernet Combination Cards, and FastNet high-speed Ethernet Adapters.

Getting in line with those who are meeting demand in the fast-growing combination card market, ActionTec offers a high-performance ComNet 28.8 Fax/Modem + Ethernet Combination Card. Speed is critical because it saves on phone line charges.

Among ActionTec's other bundled products, its DataLink 14.4 and 28.8 fax/modem, FastNet Ethernet adapter, and ComNet 14.4 and 28.8 fax/modem/Ethernet combination cards now will come packaged with LapLink's remote access and file synchronization software. ActionTec's critically acclaimed LapLink for Windows provides integrated remote control, letting users access desktop and network databases, E-mail, and other applications from a portable PC.

In keeping up with the darker side of the computing world, ActionTec has also bundled McAfee's *VirusScan* antivirus software. It will be packaged with Datalink fax/modems and ComNet fax/modem/Ethernet combination cards.

These are by no means the only corporations producing PC Cards, but they give you an idea of what's available in this ever-expanding market. ●

by Richard Egan

For More Information:

PCMCIA
(408) 433-2273

Thomas-Conrad Corp.
(800) 332-8683
(512) 836-1935

Motorola
PCMCIA Products Division
(800) 427-2624

3Com Corp.
(800) NET-3Com
(408) 764-5000

ActionTec Electronics Inc.
(800) 797-7001
(408) 739-7000

ActionTec's ComNet PC Card offers fax/modem and network capability along with an impressive software bundle.

Java Buzz Flows Through Web World

Clear the decks of Information Superhighway clichés and get ready for every coffee-related play on words you can imagine.

Just when we thought we'd heard enough about the Internet and its World Wide Web, talk of a new programming language called Java is jolting headlines once again. Though Java isn't much to look at today, the hype is backed by some high hopes.

The Web, a cross-referenced collection of Internet-accessible documents scattered on computers around the world, provides the wired public with a vast and rapidly increasing amount of information. The key to the Web's popularity is its ease of use across multiple platforms. Whether you run Windows, Unix, or a Macintosh, you can crawl along the same Web everyone else sees with point-and-click simplicity. This is because all Web pages are written in a standard format called **HTML**, or **Hypertext Markup Language**. Browsers, the programs used to view what's on the Web, all understand HTML and can display documents formatted in this way, just as VCRs that conform to VHS standards can share videotapes.

The HTML standard has its drawbacks, however. Though Web pages can display text and graphics, formatting is quite limited. The snazzy layouts featured in magazines and other printed material are difficult or even impossible to reproduce using HTML's meager toolbox. It wasn't that long ago when Web users hailed a new ability to actually center text on a page.

Java, a programming language or "code" developed by Sun Microsystems that's used to write software, is a revolutionary way to add downloadable software, or **applets**, to the HTML mix. Applets, in conjunction with Web browsers designed to support them, can make Web pages perform virtually any task: animation, calculations, input, you name it. A few sites are already using Java applets to display real-time, constantly updated information such as news or stock quotes in scrolling banners.

While such improvements are useful to the Webmaster, the nature of Java has implications beyond spicing up HTML. Traditional rivals such as Microsoft and Netscape are rushing to embrace the Java standard and incorporate it into their products. Business and computer publications are devoting gallons of ink discussing it. Some pundits go so far as to predict Java will upend the world of software, completely changing the way we use computers.

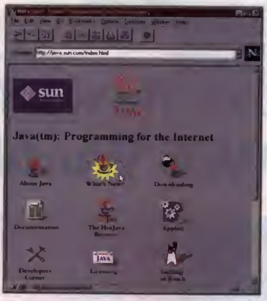
■ Wintel Killer

Today's computer world is dominated by Microsoft operating systems, such as Windows, running on machines featuring Intel central processing unit (CPU) chips, such as the 486 or Pentium. This so-called "Wintel" duopoly drives the industry. In order for a program to have any chance of marketplace success, it must be written to run in this environment.

Java might loosen the two-handed Wintel grip through its **portability**, or ability to run on many different systems. With the vast mix of hardware seen in today's computers, porting software from one platform to the next becomes a challenge of nightmarish proportions. Since relatively few users lack Windows, it often makes little financial sense to create versions of software for other operating systems.

Java and similar schemes represent an age-old programmer's dream. With Java, software developers need not worry about the nuances of each particular hardware or operating system setup. Every Java program can run in every Java-capable environment. Whether the Java shell is running on a Mac, a 486 PC, a Unix system, or computers not yet built, programmers have to write only one set of code.

Such complete portability would be a boon for smaller hardware and software companies. No longer would all PCs need to be compatible with Intel's dominant x86 standard. Without something like Java, it would be nearly impossible to launch a new type of computer since almost all software is written to support the Wintel or Macintosh standard. In the Java world, all a new computer would need is an operating system that can understand Java. Once a computer has that one piece of software, every Java program is compatible.


File Edit View Go Bookmarks Options Directory Window Help
http://java.sun.com/index.html
sun
Java(tm): Programming for the Internet
About Java
What's New
Downloading
Documentation
The HotJava Browser
Applets
Developers Corner
Licensing
Getting in Touch

Sun Microsystems, developers of the Java language, serves up news about its creation on the World Wide Web.

A standard like this would be much more open than Wintel and could encourage new computer and operating system manufacturers to get into the business. When combined with the Web, the open Java system becomes even more accessible. Companies can distribute software that loads into the target computer from over the Internet, configures, and starts itself. Installation as we know it today, which can become a scary process, may be unnecessary with Java programs. Setting up a new application could be as simple as pointing and clicking a Web hyperlink.

Software companies could take advantage of this feature along with the concept of object programming to build a new library of applications less ponderous than those of today. The latest big word processors, for instance, include dozens of features the average person does not need. Rather than buy a function that might only be used once, companies and individuals could opt to "rent" Java software objects on a per-use basis off the Web. Some large programs might be combinations of objects stored in the home computer and continuously updated Java Web objects rented or licensed from a software company or information provider.

For instance, a future Java word processor might be largely stored and run off a local hard drive. Certain components of the program, however, could reside somewhere on the Web. When the user presses a button for a spell check, the computer's operating system could contact a software company for the latest, fastest version of its spell checker. The software company, in turn, might be using a continually upgraded list of words supplied by a dictionary firm. In an interconnected world that all speaks the same language—Java—such a scenario is possible.

Another example might be a business that performs certain number-crunching duties at the end of every year. Rather than buy an expensive program that would be outdated by the next year, the business might rent a Java version off the Web, use it once, and throw it away. The next year, a new, updated version could be rented.

Along with making it easier to obtain and run software off the Web, Java can make the Web itself more powerful. The language dramatically increases opportunity for Web authors. Static displays are no longer the only option. Java allows the creation of Web sites with virtually any feature found in any other computer program. Web sites could use this power to become much more interactive than today, with chat rooms, multimedia elements, and other goodies. What's more, these superpages can be continually updated with information from around the world—news, financial quotes, sports scores, images, or anything else that can be displayed on-screen.

Some Silicon Valley executives, such as Oracle's Larry Ellison, are even pushing for Java-savvy computers driven almost completely off the Internet. Oracle plans to market scaled-down "Internet box" computers this year, which would cost less than $500 but allow full access to the World Wide Web and its Java applets. Such appliances would have no need for ponderous operating systems such as Windows 95. The immense Pentium-Win95 standard of today, so the idea goes, would be rendered obsolete in a new age of Microsoft-free, Java-hugging machines.

Back To Earth

Talk of dethroning Wintel is heady stuff, and not everyone buys into the vision that the Old Order is done for. While a few of Microsoft's competitors throw out ideas as though the revolution is scheduled for next Tuesday, industry watchers say consumers shouldn't hold their breath in anticipation of some major shift.

Robert Seidman writes *Seidman's Online Insider*, a popular weekly electronic newsletter. He calls the idea of the cheap Internet box "smoke and mirrors" and says he remains unconvinced of Java's world-shattering potential.

"When the Web came out, that was a huge thing," he says. "I don't see Java as being as big as that. There isn't anything being done in Java that enhances the quality of the experience now."

That doesn't mean Java doesn't have potential, Seidman says, but the obstacles between today and tomorrow are numerous and significant. One of the biggest thorns threatening to deflate the Java balloon is **bandwidth**, the size of the "pipe" that pumps information over the Internet into homes and businesses. E-mail and other simple communications are fine with a dial-up connection over a 14.4 **kilobits per second (Kbps)** modem, but even today's modest Web graphics can slow the show considerably. Downloading dancing little Java cartoons is one thing, but low-speed hookups won't be a fun way to run useful applets. (A kilobit equals 1,024 bits.)

New technology and telecommunications companies promise better speeds in the future. ISDN modems that run data through special phone lines at 64Kbps are popping up in certain areas. Cable companies are testing high-speed computer connections that would use the nation's existing infrastructure of coaxial lines. AT&T is reportedly working on a system called GlobeSpan, which uses a new type of modem to pump an unbelievable six **megabits per second (Mbps)** through standard phone lines. Until one or a combination of these systems becomes widespread, however, Java will be more of a hobby or plaything than a useful tool. (A megabit equals about 1 million bits.)

Security is another issue that must be resolved before Java gains mainstream acceptance. In a business world jittery over hackers, viruses are a major concern. Java was designed to keep potential viruses from invading non-Java areas of computers, but time and experience are the ultimate test. The industry has seen supposedly tamperproof designs fall prey to clever college students before.

MS Java

In spite of these obvious difficulties, Java took one giant step toward success last December when Microsoft CEO Bill Gates announced his company would license the language from Sun for use in its own products. Industry analysts quickly set about the task of declaring winners and losers in the deal, but the real beneficiaries will be average computer users. Microsoft's acceptance of the Java standard is bound to speed construction of Java applets. Instead of choosing between two or more competing standards, developers will be able to concentrate on Sun's system.

No one doubts that Java, the phenomenal growth of the Web, and Win95's improving Internet capabilities are starting to smear the line between operating system and Web browser. If the Web continues to mature and Java lives up to half the popularity predicted for it, the foreseeable future may bring a Windows or Netscape operating system that also can browse the Web and run Java software. The Internet could become a true, transparent extension of the desktop.

This ubiquitous network of networks is an enormous and growing factor in computing. Even if Java sputters, a similar plan probably will take its place to facilitate the development of the Web. It remains to be seen how much influence Java-like ideas might have on traditional software distribution, but the new tools surely will make the Internet a more friendly and colorful place. As Java perks up around the Web, it isn't spilling the beans to say the future continues to brew in cyberspace. ●

by Alan Phelps

Surfing For Java

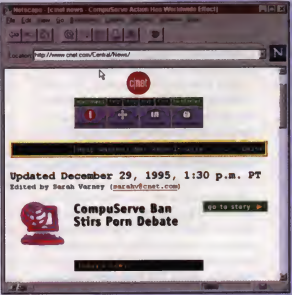
Java may make for interesting reading, but actually trying it out requires an Internet connection and a World Wide Web browser capable of displaying Java applets.

The first part of that equation is the most difficult to fill. Java programs weigh down the average Web page, making it slow to load. A direct Internet connection is ideal, but in the real world, most people have dial-up **PPP** or **SLIP** connections over modems. As with all Web browsing, a 14.4Kbps modem is about the minimum necessary to have anything close to fun. (SLIP/PPP [Serial Line Interface Protocol/Point-to-Point Protocol] lets you connect your PC to the Internet itself rather than logging on through an Internet access provider.)

If you're wired to the 'Net and have some experience with the Web, finding a Java-capable browser is a relatively simple procedure. The latest versions of *Netscape Navigator for Windows*, Windows 95, Macintosh, and Unix systems are available at http://home.netscape.com. As *PC Novice* went to press, Microsoft promised that a Java-enhanced Internet Explorer browser would soon be available at its http://www.microsoft.com site. Sun Microsystems, the makers of Java, has its own free Java browser at http://java.sun.com, but Sun's browser is generally inferior to the other, more popular packages. All three of these applications are offered free for private use.

Once you've installed a Java browser and have everything configured correctly, cruise to Sun's site. Pointers there lead to pages filled with test applets of various kinds. Netscape offers a more interesting page listing sites that employ Java on the open Web. One of the first to do so was c|net at http://www.cnet.com, which as we wrote this featured a ticker-tape-like scrolling headline banner at the top of the page.

Java is still warming up, but a tour through these Web sites shows some intriguing examples of what might be. Most of the applets available today seem a bit underwhelming, but they are a far cry from the boring Web of the past. ○


Netscape - [c|net news - CompuServe Action Has Worldwide Effect]
File Edit View Go
Location: http://www.cnet.com/Central/News/
N
c|net
go to story

Updated December 29, 1995, 1:30 p.m. PT

Edited by Sarah Varney (sarahv@cnet.com)

CompuServe Ban Stirs Porn Debate

The daily news page at c|net's popular World Wide Web site features a scrolling, continually updated, Java headline banner.

A Map To The Internet

Information is power. An old saying, perhaps, but it's more true today than ever before.

By now, just about everyone, with the possible exception of cave dwellers, has heard of the vast reserves of information available on the Internet. It has become a leading place to go when seeking knowledge on a topic. Cyberspace junkies can't get enough of the riches that can be found with a mouse-click.

But what about Internet newcomers? They may feel overwhelmed by everything the vast network has to offer. It can be a slow, tedious process navigating to remote destinations. There are a variety of methods available to help you weave your way through cyberspace, however, including several, free search tools available on the Internet to help make your travels more fruitful. And since online time isn't free, knowing where to find information will save money as well as time.

Information is stored and exchanged in a variety of ways on the Internet, including E-mail, file-transfer protocol (FTP), Wide Area Information Servers (WAIS), Usenet newsgroups, and the World Wide Web. The World Wide Web has become the most popular means for many users to travel, or surf, the 'Net. And there is no shortage of software applications that let users take advantage of everything the Internet has to offer.

The World Wide Web

The **World Wide Web**, generally referred to as the Web or WWW, is a multimedia environment developed at CERN, the European Research Laboratory for Particle Physics. The recent increase in the popularity of the Internet is mostly because of the ease with which new users can access and use the Web. Once on the Web, users can travel around the world via their modem with just a mouse-click. This is accomplished easily because sites are linked together in a **hypertext** format. (Hypertext is a presentation of information in which text, sounds, images, and actions are linked through complex associations that let users browse related topics.)

The Web is hypertext on a global level. Click highlighted text at one site, and you can travel across town or halfway around the world. Just about everything you can do on the Internet is done easier on the Web.

With readily available Web browsers such as *Netscape Navigator* and *Mosaic*, users can access the Web and search for information and files using one of many different search functions, which include Lycos, WebCrawler, and Yahoo. Users also can search FTP sites using FTPsearch'95 or access Usenet newsgroups using DejaNews.

Here are brief descriptions of some of the search utilities available on the Web.

Lycos (http://www.lycos.com). Lycos may be the most efficient of the many search engines available. The prime advantage of using Lycos over other search engines is the sheer volume of information it has cataloged. Currently, 91% of the Web—more than 10 million sites—is indexed in Lycos.

By using Lycos, you can be sure you've conducted a thorough search of the Web for information. It displays a list of Web sites matching your query and provides brief excerpts from home pages with the highlighted keywords used in the search. This feature lets you quickly judge whether or not a site will be useful to you.

WebCrawler (http://www.webcrawler.com). WebCrawler began as a research project at the University of Washington at Seattle but recently came under the control of America Online. It's still freely available as an Internet search tool, however.

WebCrawler lets you search for phrases as well as keywords and will display a list of **hyperlinks** to satisfy your query. The responses are rated on a scale from zero to 100 based on how relevant the site is to your query. WebCrawler is easy to use and fairly fast, but it doesn't have many options to streamline the search process. (Hyperlinks are connectors that jump users to different locations on the Web when they click highlighted words.)

Yahoo (http://www.yahoo.com/search.html). Yahoo is one of the most popular Web search tools, primarily because of its name. Yahoo stands for Yet Another Hierarchically—Officious/Obstreperous/Odiferous/Organized—Oracle and was developed at Stanford University. Yahoo's catalog isn't as complete as the one on Lycos and it's not a speed demon, but it's easy to use and carries some of the more popular sites in its catalog.

DejaNews (http://dejanews3.dejanews.com). If you're a frequent user of Usenet newsgroups, DejaNews is a search tool that can speed your browsing. Users can search an indexed archive of most Usenet postings (excluding alt.*, soc.*, talk.*, and *.binaries). DejaNews will display the list of matches where users can view a message, post a response to the message, or E-mail the originator of the message directly.

DejaNews is a fast, efficient search tool designed specifically for Usenet newsgroups. Searches can span over many newsgroups, encompassing vast amounts of data. You also can create a query filter to limit the search to specific newsgroups.

Downloading Files

The preceding list is just a sample of the search-and-retrieval capabilities available on the Web. But new users beware: The multimedia characteristics of the Web make a fast modem a must. So if you find your 9600 baud modem is slowing you down, preventing you from taking full advantage of the Web, fear not. Here are a few alternative methods for downloading files and retrieving information from the Internet.

File-transfer protocol, commonly referred to as FTP, is the way users transfer files from remote sites to their computers and vice versa.

When downloading files, users log on to what is commonly referred to as an FTP site using anonymous FTP. This means that you type **anonymous** in the user identification field and your E-mail address in the password field. This lets host sites keep track of who is accessing them and what users are downloading.

For instance, if you wanted a copy of *WinZip*, a popular file compression program for Windows, you could download one using anonymous FTP by going to the FTP site at hubcap.clemson.edu. There you could browse the path/pub/pc_shareware/windows/Archive, where you would find the file Winzip56.exe. Using your FTP software, you could download the file to your computer.

But what if you don't know where to find a copy of WinZip?

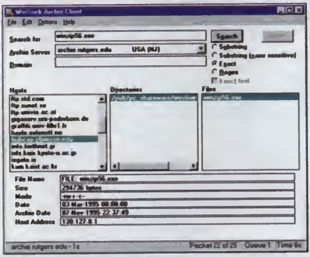
Archie To The Rescue

One disadvantage to downloading files from FTP sites is trying to locate what you want. Directory structures at FTP sites can be confusing to newcomers. To help users avoid getting lost at an FTP site, the Internet offers a search function called Archie.

Archie, which is on about 30 servers worldwide, is a free service available to anyone on the Internet. This system lets users search the vast network of FTP sites to locate general directories or specific files. With Archie, users can enter a specific file name or a general topic, then Archie will respond with a list of FTP sites where your file or topic can be found.

There are a number of shareware and freeware Archie and FTP applications that make finding and retrieving files from an FTP site a simple process for even the most inexperienced user. The basic *WinSock Archie Client* is easy to learn and works with FTP software such as *WS-FTP*. Simply run your query, scan the results, and download your file.

If you prefer to stick with the World Wide Web, try *FTPsearch'95* (http://ftpsearch.unit.no/ftpsearch). FTPsearch'95 searches FTP sites much the same way Archie does. Enter your query parameters, and FTPsearch'95 will return a hyperlinked display of FTP sites. Just click the site that best suits your needs to retrieve your file.



Search for: winzip56.exe
Archie Server: archie.rutgers.edu USA (NJ)
Domain:

File Name: FILE winzip56.exe
Size: 294736 bytes
Date: 03 Mar 1995 00:00:00
Archie Date: 07 Nov 1995 22:37:49
Host Address: 130.127.8.1

archie.rutgers.edu - 1s Packet 22 of 25 Queue 1 Time 6s

With *WinSock Archie Client*, users can search for specific files at FTP sites or just explore directories.

Gopher Helps Navigation

In an effort to help users readily navigate the information available on the Internet, developers at the University of Minnesota perfected a program called Gopher. Gopher lets users burrow into the Internet using a series of interconnected menus that look similar to the File Manager in Windows. With an application such as *WinSock Gopher*, users can connect to a Gopher server and move through an alphabetized list of headings to search for information.

Once connected to a Gopher server, users can access a search utility called Veronica (Very Easy Rodent-Oriented Netwide Index to Computer Archives). Like Archie, Veronica is a free service available to Internet users. Veronica lets users search Gopherspace and returns an easy-to-follow list of documents, files, and directories that match your query. Simply click the title to download the file or view the document.

Gopher also gives users the capability to access the vast resources of **Wide Area Information Servers**, commonly referred to as **WAIS** (pronounced "ways"). WAIS is a networked information retrieval system where servers search an index for keywords and return a list of matching documents.

Commercial Providers

If the Internet still seems too immense and confusing for you, there are alternatives. Commercial online services, such as CompuServe, America Online, and Prodigy, are more readily accessible and much more organized than the Internet. And when you're ready, these providers all offer direct access to the 'Net.

The online services are organized into topic-oriented forum and bulletin board areas that make locating information a snap. In addition, they all offer access to various libraries and information services, but beware of the surcharges. Certain areas, such as the magazine and computer libraries on CompuServe, cost extra to access, view, and download an article.

If you effectively manage your online time, however, you can keep costs down. CompuServe starts at $8.95 per month for basic service while America Online charges $9.95 per month. Prodigy offers its value pack plan starting at $14.95 per month.

Whatever your topic, however arcane, rest assured it can be found somewhere on the Internet. The search tools are available and easy to use. And if you have questions, a friendly soul in cyberspace should be able to help you. ●

by Tracy LeBlanc

For More Information:

CompuServe
(800) 848-8990
(614) 529-1340

America Online
(800) 827-6364
(703) 448-8700

Prodigy
(800) 776-3449
(914) 448-8000

Find It ONLINE

CompuServe Entrepreneurial/ Small Business Forum:

Go: entrepreneur

CompuServe's Entrepreneurial/Small Business Forum provides you with lots of support for operating your home business. From this site, you can access 11 personal business-related forums with topics ranging from Working At Home to Agriculture to MBA. Each of these smaller forums gives you the chance to post questions—and answers—to message boards, download informative articles offering helpful business advice, or chat with other entrepreneurs.

Essential Data Inc.:

http://netmar.com/mall/shops/edi

Essential Data Inc. gives you the opportunity to set up your home office from the comfort of your home office with this online purchasing site. You can browse through the catalog of products, including sale items; call the toll-free number (or E-mail them at CompuServe or on the Internet) for product information before you purchase; or order the products using your computer's modem. After ordering, you just wait for UPS to deliver the merchandise in two days.

World Business Solutions:

http://thesolution.com

Sound, practical business advice always has been a vital element to the success of any commercial enterprise. Now, small business advice is no further away than your modem connection with World Business Solution's online consulting site. Post questions to the site's message board to receive responses from successful business owners across the country, or just read through the list of responses already given to pick up helpful advice.

Ambleside Logic:

http://www.al.net

Even the most brilliant money-making idea will fail without consumer support. Ambleside Logic, a subsidiary of The Rosenbaum Group that concentrates on promoting regional strategies to help businesses thrive within their communities, can help you build a large, loyal consumer base through the numerous articles found at its online consulting site. The articles are free to read and will inform you of social and economic trends that may affect your personal business.

Entrepreneurs' Exchange Index:

http://www.astranet.com/eexchange/jc00indx.htm

Using the experience of small business owners everywhere, the Entrepreneurs' Exchange lets you contribute a personal essay explaining your business philosophy or offering advice to others who are trying to improve their own businesses. Likewise, you can read the essays written by other entrepreneurs around the world. This Internet site is based on a Prodigy forum of the same name. Jump: **entrepreneur** to access the Entrepreneurs' Exchange from within Prodigy.

U. S. Small Business Administration:

http://www.sbaonline.sba.gov

Providing information about government financial incentives, entrepreneurial consultants, advantageous marketing concepts, and other resources to help you get your business started on the right foot, the Small Business Administration (SBA) is a great companion for the fledgling entrepreneur. This site gives you the inside track on the benefits government offers a new business.

The Small Business Resource Center:

http://www.webcom.com/~seaquest

The Small Business Resource Center is a one-stop site for the small business owner. Download any of the 28 informative business reports for information about starting and managing various small business operations, or use one of the business links to jump to another Web page with more advice on starting your own business.

One-Eleven Web Place:

http://www.111webplace.com

Considering the wide range of business opportunities that have become possible through Internet communication, it's no wonder that most successful businesses have established at least a toehold in cyberspace. One-Eleven Web Place gives you the chance to stay on the cutting edge by creating an engaging Web site that will attract attention to your small business. Check out their creative designs and styles at this Web site, then contact the home page "architects" directly for assistance in the implementation of your ideas.

To celebrate two of March's most famous events, we've highlighted a pair of Web sites that will put a smile on your face, color in your cheeks, and a sparkle in your eyes.

Henry Street Irish Link Page:

http://huizen.dds.nl/~vonb/hs-index.html

Failte go Sraid Anrai! Welcome to Henry Street! Put away your green beer and corned beef, and pay some respect to the real spirit of St. Patrick by discovering what the Irish are really like this St. Patrick's Day. The Henry Street site contains around 220 links to Ireland-related Web sites. You can find out the season record of your favorite hurling team, trace your ancestral lineage, check out the most recent news from the Dail, or enter the debate about the situation in Northern Ireland.

College Basketball:

http://www.cs.cmu.edu/afs/cs.cmu.edu/user/wsr/Web/bball/bball.html

What would March be without the Madness of college basketball and the NCAA tournament? This PTP (prime-time page) keeps you up-to-date on the team rankings, conference standings, scores, late-breaking stories about men's and women's basketball, and much more, baby. Finally, make sure you hit the diaper-dandy link to the Meadowlands Madness Page, which takes you directly to the site of the 1996 Final Four. Dick Vitale would be proud. ●

Compiled by Jeff Dodd

Let's Go Internet

Bit by bit and piece by piece, the Internet has gradually developed from a strategic, military communications device into an extravagant culture of universal dimensions, complete with unique customs, rules, and organization. Like travelers to a foreign land, first-time online users must not only learn the language and grammar of this global network, but they also must gain an understanding of the idioms that give the Internet its peculiar flavor.

To help ease any anxiety that may arise as a result of these "cultural" differences, we've compiled a tourist's guide that will introduce you to the more obvious colloquialisms and customs of the 'Net and hopefully make your stay more enjoyable.

Addresses

One of the most confusing aspects of the Internet is its address system. The virtual world of the Internet lacks the physical, territorial divisions used to determine addresses in the actual world. There are no concrete property lines, civil boundaries, or geographical features in cyberspace. The absence of such distinct physical regions requires a new type of address system based on the concept of virtual communities. (Actual and virtual are used here as antonyms, whereby actual refers to the tangible world of our existence, and virtual refers to anything that may seem to exist but actually doesn't in the physical world.)

To add to the confusion, Internet users often assume an alternate identity for their online trysts. While some users do this for personal reasons, many others are required by their online service to arbitrarily devise a code name that will distinguish them from other users of the service. So instead of addressing John R. Smith or Sally W. Jones, Internet users are more likely to communicate with Mr. Happy or Chatterbox.

The most annoying consequence of using an online pseudonym occurs when you're attempting to contact individuals who use their given names in their daily activities but employ their often-changed aliases on the Internet. As virtual and actual communities continue to become more intertwined, this duality of identity will only create more confusion.

Fortunately, the Internet isn't as unorganized as it may seem initially. Each Internet address provides specific information about the type of site it is and where it is located. The key to understanding the addresses is to remember that the address is composed of user names and domains rather than cities, states, and streets.

The **user name**, normally used only in E-mail addresses, identifies the person being contacted. It lets you distinguish one person in a group, such as a home, a business, or a school. The user name often is a play on the given name of the individual being contacted, but it doesn't have to be and may be an identification number.

The **domain**, on the other hand, identifies the group of people. An address may reveal a number of domains, in which case the largest, most general domain is known as the **top domain**, and the subsequent, more specific domains are referred to as **subdomains**. Domains and subdomains are separated by periods or backslashes. The user name and domain will give you all the information needed to decipher three of the most popular address categories on the Internet: E-mail, **World Wide Web** sites, and newsgroups. (The World Wide Web is a graphical Internet interface that links related sites.) Examples of each address category are explained below.

jsmith@plato.nyu.edu. E-mail addresses are the most common type of address found on the Internet. Simple in composition, they are made up of two parts separated by an @ sign. The information found to the left of the @ sign reveals the user name. In the above case, "jsmith" is the user name. The information found to the right of the @ sign reveals the domain and subdomains, which are listed, left to right, most specific to least specific. In the given case, jsmith's E-mail account is registered on the Plato network, which is a part of New York University. (A subdomain can indicate department, network, and even a particular computer.)

The three-letter abbreviation of the top domain, which in this case is "edu," denotes that "nyu" is an educational institution. Below is a list of the most commonly used three-letter abbreviations:

edu—designates an educational institution site

gov—designates a government site (although state-funded universities are denoted edu)

com—designates a commercial site

mil—designates a U.S. military site

net—designates a network site

org—designates a private or nonprofit organization site

http://www.acme.com/retail/anvils.html. Web site addresses consist entirely of a series of domain and subdomain listings, separated by backslashes, which are listed from left to right, least specific to most specific.

Each of the groupings in the series of domain listings represents the Internet address (similar to the E-mail address) of one portion of the path that leads to the desired Web site. Web site addresses could indeed be called paths because they guide the user to the data. Each address is read and recognized before the data proceeds to the next one. Like a shopper walking through the aisles, a user who wants to access the data at "anvils.html" (in the above example) must first connect to "www.acme.com" and then pass through "retail" before reaching the desired destination.

Four standard elements of a Web address reveal the type of site it is and where it is located.

* http://—This abbreviation, which stands for **Hypertext Transfer Protocol**, designates that the site is indeed a Web site. Http indicates that the page can handle nonsequential links to other hypertext pages, a trait characteristic of all Web pages. You may encounter **ftp**, which stands for **File-Transfer Protocol** (a standardized method of transferring files), sites as you peruse the Web. Downloadable **shareware**, or low-cost software, is often located at ftp sites.

You also may see a Web address referred to as a **URL**, which stands for **Unique Resource Locator**.

* www—This abbreviation stands for the World Wide Web. Many Web sites contain these three letters, but you will encounter some that don't. It's OK if it doesn't.

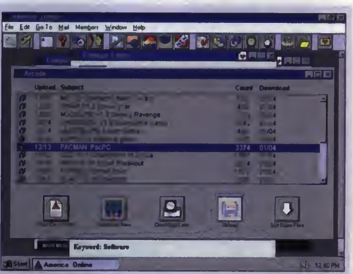
* html—Html stands for **Hypertext Markup Language** and reveals the type of programming code used to create the Web page. Not all Web sites will contain this suffix, and you may even encounter some that have the new **vrml** suffix. Vrml stands for **Virtual Reality Markup Language** and indicates that the page is constructed according to three-dimensional standards.

* acme.com/retail/anvils—We've finally reached the actual address, or pathway, of the Web site. The top domain is listed first. In this case, the top domain is Acme.com, which indicates that this is the Acme Web page. The three-letter abbreviations found in this section are the same as those given above for E-mail. The subdomains show that the user is checking out anvils sold by Acme. The subdomains can indicate any type of connection made in the data path, so they may not be as obvious as the example. It is important to enter all Web addresses exactly as they appear. Don't assume spelling errors until after you've tested them.

rec.sports.professional.football.saints. Newsgroup addresses are the simplest to interpret because they are usually quite straightforward. The domains are listed from left to right, least specific to most specific. In the above example, the address indicates that the top domain is recreation. Other popular top domains are "alt" (alternative), "comp" (computers), and "misc" (miscellaneous). The subdomains finally—and quite obviously—indicate that the topic of discussion in this newsgroup is the New Orleans Saints professional football team.

Downloading

Downloading— receiving a file, document, or program sent from another computer via a modem—shareware and freeware (free or low-cost software) can increase the functionality of your computer, enliven your monitor, and provide hours of entertainment. Many users fail to take advantage of downloadable shareware, however, because they're unsure of how to acquire it. Or, if they do download an application, they don't know how to make it work.



A download manager takes you step-by-step through the downloading process, making it a cinch.

Shareware describes downloadable programs that require a payment from those who use them. **Freeware** describes downloadable programs that are free for the public to use. Most smaller files, such as pictures, video clips, and sound bites, are freeware, whereas larger files, such as games and applications, are shareware. Shareware developers are usually small-business owners who depend on your honesty for their living. You don't have to register and pay for a program you try once, but if you find yourself using a shareware application repeatedly, you are obligated by the honor system to pay for it.

The first step in successful downloading is finding a downloadable file. If you're connected to an online service, go to the forum that interests you, and select a category to investigate. Look for a Download Area, Media Library, or Software Library icon that indicates the presence of shareware or freeware. Not all downloadable files will be located in such an obvious area, and you may have to do some intense exploring to find some shareware applications. But these libraries are ideal starting points for first-time downloaders. Call your online service provider for assistance if you have trouble finding a software library.

Open the software library, peruse the listings available to you, and select a file of interest. If your online service offers a **download manager**, it will appear at this time. The download manager gives you the opportunity to learn more about the selected file. Take note of the memory space required to store the file, and consider the amount of time needed to download it. After you decide you would like to view the program, select the Download Now/Retrieve icon in the download manager to download the program immediately. You also may be given the chance to select a Download Later option, which lets you download at a later time.

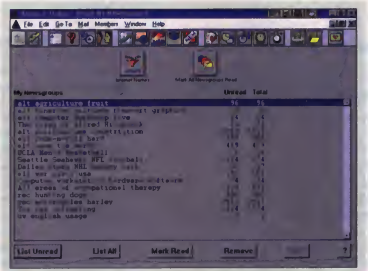
When you decide to download, you'll be asked to select a destination. Choose the download file found in the online service folder on your hard drive, or select another folder reserved specifically for downloaded software. This will help you keep track of what you have downloaded and will let you recall or delete the programs with less hassle. The download manager will post the amount of time remaining to process the download and alert you when it's finished.

Downloading from an Internet site is quite similar to downloading from an online service site except that you don't receive the assistance of a download manager. After you have located a file for downloading, double-click the title or icon. (Downloadable programs on the Internet may be highlighted in bold print or in a different color, or they may be explicitly marked, "Click here to download program X.") You will be asked where you want to save (or send) the file, at which point you should select your designated download folder. After selecting a destination location, the file will download.

You'll have to pay close attention to your computer to follow the progress of the download since you won't have a download manager to tell you how much has been transferred and when it's completed. When the hard drive indicator light stops glowing, the download has been completed.

Using Shareware

To use a recently acquired shareware application, close your Internet connection, and use either the File Manager (in Windows 3.1) or My Computer (in Windows 95) to open the drive and folder in which the application was saved. Locate the downloaded file, and double-click it. Text documents and other small files should open quite easily, but larger documents may have been compressed and will require decompression before they can be viewed.



Newsgroup addresses are generally self-explanatory and straightforward, which allows for easy browsing.

Data compression is a method of condensing information so it can be stored in less space or transmitted in less time. A compression program searches for redundancies in a file, then compresses the identical pieces of data into one representative token. Some compressed programs come equipped with their own decompression utilities, while others will require that you already have one. Some of the most popular decompression programs, such as *PKUNZIP*, are shareware programs themselves and can be obtained from Internet sites.

Open the application, and look for a file with the .EXE extension; this will most likely be the decompression utility or the setup file. Double-click this file, and follow any instructions provided. Remember to register your shareware applications. Registering your shareware lets you receive technical support for any questions you have about a program.

Glossary Of Terms

Like most communities, the Internet has a set of peculiar phrases and idioms embraced by its members that let them discuss objects, actions, and experiences that don't exist outside the community. Proper use of the following words and phrases will show others that you're familiar with the Internet, and therefore, an active participant in the great communications revolution.

'Net—This is the nickname for the Internet. Rather than tire your tongue with three syllables, use this succinct monosyllable to imply that you have an intimate, first-name-basis relationship with the Internet. To sound even cooler, also use the terse "Web" instead of World Wide Web.

Cyberspace—Here's a word that refers to everything and nothing at the same time. While cyberspace technically refers to the entire vast configuration of the Internet, there is actually no data-saturated "space" floating around. All information on the Internet is actually contained within a palpable storage unit, such as a hard drive or diskette. Use this word when you're unsure of what you're talking about but want to sound like you're sure.

Log on/Log off—This means to connect to or disconnect from an online service. When you use these little phrases, your friends will imagine that access to the Internet is a privilege. Couple these phrases with a few abbreviations, initials, and numbers—"Sorry I'm late, but I had to log off of AOL at 2145 so I could log on to my BBS at 2150"—and they'll really think you're a busy, important person.

Multimedia—Here's another ubiquitous adjective that simply refers to any object that affects more than one sense. Although this term can be used to describe almost every object in the world, it is still a marvelous new concept to those in the computer industry. If you really want to confuse your computer-nerd acquaintances, say things like, "This is Max, our multimedia dog. He likes to bark and rub against your leg" or "Watch out for my wife's multimedia meatloaf. It looks, smells, and tastes like melted tires."

Remember: You can read all you want about the Internet, but you can't really understand it until you've been there. Don't be afraid to try new things and journey to sites you've never before seen. And if you happen to get lost, log off, and start all over again. ●

by Jeff Dodd

Q&A

Need help with your hardware or software?

Looking for simple explanations on technical subjects?

Send us your questions!

DOS COMPUTING

Q: *My Config.sys file has the line "Device= C:\WINDOWS\Smartdrv.exe\Double _buffer". Why is it there? Does it have anything to do with me being unable to run Windows in "Enhanced" mode?*

A: When Windows installs itself, it tests to see if it can understand your hard drive. If your hard drive has a SCSI controller or a caching controller, Windows adds that line to your Config.sys file. But sometimes, **double buffering** doesn't switch on even though you have the line there. (Double buffering is the use of two temporary storage areas to hold information moving to and from a certain device.) If you have a SCSI controller and double buffering isn't active, you may be unable to run Windows in Enhanced mode. To force double buffering, add a "+" to the end of your Smartdrv.exe line.

WINDOWS 3.1

Q: *Can I set up a permanent or temporary swap file on a "stacked" disk drive?*

A: A stacked drive is one on which you're running Stac Electronics' *Stacker* utility. Windows 3.1 doesn't allow a permanent or temporary swap file directly on a "compressed" drive, whether that compression was done with Stacker or any other disk compressor. However, there's always a hidden "host" drive underneath the compressed drive. For example, if your C: drive is compressed, there's often a "real" partition called G: that, if it has room, can accept your Windows swap file. Most of the space on the host drive, however, is taken up by one giant hidden file, which is where your C: is pretending to be a drive, so often there's very little space left.

If there's not enough space on the host drive for your swap file, use the utilities that came with Stacker to adjust the space there. Of course, you'll have to figure out whether your host drive is G:, H:, or whatever. Go into Control Panel, click the 386 (or Enhanced) icon, open the Virtual Memory dialog box, and tell it to put your swap file on, say, H:. One tip: If you have plenty of RAM (16MB or more), you might try telling Windows to use *no* swap file at all. The swap file is there for creating "fake" (or "virtual") memory when you run out of real RAM (that is, it's disk space pretending to be RAM), so if you've got oodles of RAM, you may not need a swap file.

Q: *I finally installed Windows 3.11 after running only MS-DOS 6.2 for years. I hoped that when Windows installed, it would install the Windows version of the MSBACKUP program that came with DOS 6.2. But no such luck. Where do I get it?*

A: You've already got it. It's on your original MS-DOS 6.2 installation diskettes. But when you installed MS-DOS, it "saw" that you didn't have Windows on your system and decided there was no point in installing the Windows version of the backup. We actually suggest continuing to use the old MS-DOS backup—or at least to not remove it. If you have *only* the Windows backup program and your Windows installation gets messed up and won't run, you'd have no way of "restoring it from your backup diskettes" because you'd be unable to get into your Windows Backup Program. (It's like locking your spare keys in your car's trunk.) Anyway, to install the Windows version of MSBACKUP (and all the Windows DOS utilities such as Antivirus), do this: Put your original DOS installation diskette #1 in your diskette drive, and, at the DOS prompt, type **a:setup/e**. This creates a Windows program group for any utilities in your DOS directory.

WINDOWS 95

Q: *I'm about to buy my first PC. I want to use Windows; however, I'm torn about which kind to get. Should I go with the tried-and-tested DOS/Windows 3.1 combo, or go with the new-and-improved, but perhaps buggy, Windows 95? If I were to go with Windows 3.1, would it be easy to upgrade to Win95? Can they both coexist on one computer?*

A: Your last question first: Yes. In the February Q&A, we explained how to run both Windows 3.1 and Win95 on one computer. But, honestly, we don't recommend it; you're just looking for trouble. Since this is your first computer, one argument against Windows 3.1 is that several of its functions are different from Win95's, so a year or so from now when you finally do convert to Win95, you'd have to unlearn quite a few things. Win95 isn't perfect, but most of the time, it's at least as reliable as Windows 3.1. You might as well jump right into Win95 and start learning the system you'll be living with for years. Any disadvantages of getting in a bit early are, in our opinion, outweighed by not having to learn two systems. As for upgrading from Windows 3.1 to Win95: It's usually not too bad, but it's often better to start with a "clean" Win95 installation.

UTILITIES

Q: *I recently downloaded a program from the Toshiba Forum on CompuServe. Its purpose is to run diagnostic tests. When I tried to run it, I got the message "Cannot execute in virtual 8086 mode". What is virtual 8086 mode, and how do I get out of it?*

A: This is the program's very technical way of telling you (a) it was designed to run in plain, old DOS and (b) that you are trying to run the program in a DOS window under Windows or that you have a memory manager (such as DOS' Emm386.exe or *QEMM* [a memory manager from Quarterdeck]) running in your Config.sys file. You get this message because a diagnostic program that analyzes hardware needs the simplest possible surroundings.

If you're trying to start the downloaded program in a DOS window "under" Windows, just go to Program Manager, click File, then Exit. *Most* computers have the line "Device=Emm386.exe" in the Config.sys file; to disable it, you can reboot (restart), and when you see the "Starting MS-DOS" message, hold down the F5 key. This will completely bypass everything in your Config.sys and Autoexec.bat files. This is called a **clean boot** and should get your diagnostic program running. (The F5 trick only works with DOS 6.0 and newer. If you have an older version of DOS, instead of using F5, temporarily rename Config.sys to Config.bak and Autoexec.bat to Autoexec.bak to keep them from running.) Remember though: At least some of the other "stuff" in your startup files is doing something important, and you can be sure your programs won't run normally until you do a normal reboot.

Q: *Robert Mullen's article "Double Your Hard Drive Capacity With DriveSpace" (September 1995 issue of PC Novice) was useful because I could use the extra disk space. I have a 486DX2/66 with a 245MB hard drive and DOS 6.2. However, when I type, as the article directed,* **drvspace** *at the DOS prompt, I get the dreaded "Bad command or filename" message. What am I doing wrong?*

A: The bad news is that DriveSpace is only available in DOS version 6.22, not 6.2. The good news is that DOS 6.2 has a similar disk compressor/doubler called DoubleSpace. The worst news is for the folks with DOS version 6.21; it has *no* disk compressor. What happened is that Stac Electronics (makers of the *Stacker* disk compressor software) claimed that DoubleSpace violated its patents. A court agreed with Stac and forced Microsoft to pay Stac $120 million and stop using DoubleSpace. Eventually, Microsoft replaced DoubleSpace with DriveSpace, but version 6.21 was released in the interim. (Even the backup program in DOS 6.22 can't compress data). So anyone owning 6.21 and needing compression has to upgrade to 6.22.

As for *you*, don't worry. In some ways, DoubleSpace is a better compressor than DriveSpace. In order to get it to work, you'll need to do two things. First, go to the DOS prompt and type **help dblspace**. The help screen that appears should tell you a great deal about DoubleSpace. Second, type **dblspace <enter>** at the DOS prompt. Before installing any disk compressor, however, we recommend: (a) doing a complete backup of your entire hard drive, (b) running SCANDISK to make sure the drive isn't messed up, (c) doing a spring cleaning and removing as many trash files as practical, and (d) running DEFRAG to defragment (pack neatly) the files currently on the system.

COMPUTER HARDWARE

Q: *My computer has a "ZIF" socket for its CPU chip. I know ZIF means Zero Insertion Force, but I don't understand how it works. Does it mean I can pop out my existing 486SX chip and insert a 486DX4-100—for example? Or does it mean I can pop out my chip and pop in an "OverDrive" chip. Also, what is the purpose of the OverDrive chip? I've read that they're not as fast as their real counterparts.*

A: Whether you have a ZIF socket or a regular CPU socket has nothing to do with what other CPU chips, if any, your computer will accept. The only difference is that a ZIF socket makes it easier to insert or remove CPU chips; a regular CPU socket requires more fidgeting and skill for the same chip swap.

The story on OverDrive chips and CPUs is different for 486 chips and Pentiums. Most slower and older CPUs (66MHz or slower) run on five volts; the practical effect is that you can pretty much swap in and out any such 486 CPUs and OverDrive chips anytime (486SX, DX, DX/2) with any other five-volt CPU in the 486 family as long as it is 66MHz or slower. (Most CPUs that are 66MHz or slower run on five volts.) The two other caveats are:

a) You may not always be able to swap *between* brands of CPUs (Intel to AMD to Cyrix).
b) An OverDrive chip can go *either* into a CPU socket *or* into a special OverDrive socket (without even removing your old CPU), but a straight CPU can go *only* into a regular CPU socket.

If you want to make your system run faster than 66MHz by pulling out your old 486SX/33 and popping in a 486DX4/100, you'll run into the fact that these newer, faster CPUs need three volts while your older board supplies five volts. You'd either have to purchase Intel's DX4/100 OverDrive CPU (which costs more than the similar, plain DX4/100 CPU) or get a five-to-three volt CPU adapter.

CPUs and OverDrive chips, *if designated exactly the same way* (for example, an Intel 486DX4/100 CPU and an Intel 486DX4/100 OverDrive), function exactly the same and perform essentially identically.

COMPUTER HARDWARE (cont.)

Intel's fastest OverDrive, the Pentium OverDrive, is finally available for 1992 and newer 486 boards with OverDrive sockets. One Pentium OverDrive is for 25MHz computers and the other for 33MHz, creating 63MHz (or 83MHz) Pentiums—sort of. They *don't* fully bring older boards up true Pentium performance. To be sure these will work with your board, call Intel at (800) 538-3373. Watch prices carefully, and make sure you're not paying almost the price of a new motherboard to upgrade *just* your CPU. (Generally, a newer board will blow the socks off an old one with an OverDrive, and it includes a modern Plug-and-Play BIOS, supports faster Enhanced IDE hard drives, etc.)

Q: *I've heard that turning your computer on and off each night causes more wear to it than leaving it on overnight. Is that true?*

A: Some engineers say that, though we've never seen hard data to support either the "leave it on forever" school or the "turn it off" school. With the newer, "green" (energy-saving) computers, which have built-in, power-saving features and the ability to put the hard drive and monitor into a suspended, low-power mode when idle, there's a much stronger argument for leaving them on all the time. There's still some argument, however, for shutting them off sometimes. While it doesn't hurt the computer's hardware to be left on, there is still a hidden risk to your data. You see, many computers are set up so that a disk diagnostic utility (such as DOS' DEFRAG command or *Norton Disk Doctor*) runs each time the computer starts itself up each morning. That routine alerts you to problems with data integrity on the hard drive. (If you *don't* have your computer set up that way, you should. It costs nothing and will definitely save your bytes some morning.) So, if you leave your computer on all the time, the startup check doesn't run, and problems can creep in without you knowing it. Also, if you're in an area with frequent lightning or power surges, leaving your PC on 24 hours a day exposes your PC to three times the electrical risk that leaving it on 8 hours a day does.

As a rule of thumb, we suggest (a) turning off your computer if you're sure you won't use it in the next 16 hours and (b) in any case, turning it off at least once a week.

NOTE: Network servers on server-based networks are somewhat complicated to restart so they're usually left on 24 hours a day even if no one uses them at night.

Q: *My computer came with only one parallel printer port on the motherboard, but I have several other gadgets that connect to parallel printer ports. For example, my ZIP drive is supposed to connect to a parallel printer port and still let a printer "daisy chain" to that correct printer port by my plugging the printer into the back of the ZIP drive. But the two seem to interfere with each other sometimes, and a technician at the printer company suggested that I just "take the easy way out" and install a second parallel port on the motherboard. What do you think?*

A: We're great fans of having two or even three parallel ports on a computer. There are more and more gadgets that connect to parallel ports: ZIP drives and other "extension drives," the neat Snappy gadget that captures still pictures from your VCR or camcorder, tape backup drives, some CD-ROM drives, etc. While most of these can be "daisy chained" together off a single printer port, as you say, sometimes this doesn't work. (In fact, we suggest ordering new computers with two printer ports.) So, yes, we agree that getting a second parallel port is a good idea. You can probably get one for between $15 and $30.

Here's the catch, though: The parallel printer port on your new computer's motherboard is probably a fast "ECP/EPP" type, but the parallel port you'd buy in your local computer store for $15 is a slower model. So, at the very least, be sure to connect the gadget that needs the most speed to your fastest built-in port. Printer port gadgets that need more speed than the printer include tape drives, ZIP drives, and CD-ROM drives. Better still: When you buy your new printer port, make sure it's an ECP/EPP type.

Until recently, we couldn't find a vendor that would sell you a separate ECP/EPP parallel printer port on a card without forcing you to buy an entire, expensive, multifunction card (which includes hard drive connectors and serial ports you probably don't need). But we're happy to report that we've found two vendors of reasonably priced cards with ECP/EPP ports. The first is the Kouwell Model KW5085D-2, which supplies two ECP/EPP ports on one card (you don't need to activate both ports); it will probably be sold by Parallel Technologies (800/789-4784). The other is the DTC (Data Technology) 2280E. While this card includes an ECP/EPP port (along with an Enhanced IDE disk controller and two serial ports), in your case, this is more than you need. You can disable the features you don't need, though, and for only $19 (NCA, 800/622-1115), you've got your ECP/EPP port.

ONLINE COMMUNICATIONS

Q: *I was at a friend's house and plugged my laptop into his phone line to check my E-mail (it was a local call to a CompuServe dial-in), but my modem wouldn't dial out. It apparently had something to do with the fact that he had a phone company message/recording service on his phone and had some messages waiting for him. What's going on, and what can I do about it if I ever run into it again?*

A: The phone company service you bumped into goes by many names, such as "message center," etc. If

ONLINE COMMUNICATIONS (cont.)

you have that service and have messages waiting, when you lift the phone to dial out, instead of a dial tone, you hear a series of beeps (this is essentially a "nonstandard dial tone") that reminds you to punch in your retrieval code and pick the messages up. If you don't want to listen to the messages, you can just go ahead and dial out anyway.

The problem is: A modem "listens" for a *standard* dial tone before it's willing to even try dialing out, so you're stuck. The simple fix is to ask your friend for the access code, pick up the messages, and try again. Since that isn't always possible, there's one other fix. Most modems will go ahead and dial out "blind" without listening for a dial tone if you give them a special command telling them to do so. That command is ATX3.

You can put that command in any number of places in your dialing software (be it CompuServe's *WinCim* or whatever). You can't put ATX3 right in with the number you dial out because the modem won't dial the number until it hears a dial tone. Most dial-out software has in it somewhere something called a **modem initialization string** or, better yet, a **dial prefix**. There you'd find some incomprehensible text such as "ATS0=&C1&D2^M" or "AT&F1^M". Find someplace that has "ATDT" in it. (ATDT is the normal command that tells a modem to dial out.) Put **atx3,,** on the end of that text. The ",," is there to put a delay. Each comma inserts a one-second delay to ensure that the modem will pause at least two seconds before dialing, giving the phone system a moment to get ready to accept the call out. It's important that if you put this ATX3,, into a place that previously ended with "DT" (which means Dial Tone), be sure you *leave* the DT there. For example, if you find your prefix set as "ATDT", replace it with **atx3,,dt**. (If it's "ATDP", replace it with **atx3,,dp**.) The downside to this is that if you put this "dial regardless of hearing a dial tone" command there, it means that if you ever *really* don't have a dial tone, your modem won't be smart enough to tell you "sorry no dial tone" and will blindly forge ahead.

WORD PROCESSING

Q: *I just got an HP-5L printer, which I'm using with my AmiPro 3.01 word processor. The button ("SmartIcon") I press to print envelopes, which worked perfectly in my old HP-IIIP printer, won't work on the 5L. The problem is that my old HP-III fed envelopes through the right edge of the paper feeder while the new HP-5L feeds them in the middle. What can I do? You'd think Lotus would have fixed the SmartIcon button, since the 5L is a popular printer.*

A: They did . . . years ago. Not for the 5L itself, but by making the thing adjustable for any printer that's not listed. Your Print Envelope dialog box (which can be found in the File menu under Print Envelope) has an Options button in it. (If it doesn't, you should contact Lotus for the latest version of the macro Envel2.exe.) Just click the Options button, and configure it for your printer. In addition to the printer list, the Options dialog box has a Portrait/Landscape switch, and if it's set for Landscape, a set of radio buttons for left/center/right becomes active. It sounds as if you need to set it to Center. The dialog box also contains an Adjust button that will let you fine-tune the position of the recipient and return addresses.

MISCELLANEOUS SOFTWARE

Q: *One support technician told me that to get my WinFax software to work properly, I have to replace the so-called "Windows Communication Driver" file, Comm.drv, with a special one that came with WinFax called Wfxcomm.drv and make a corresponding change in a line in my System.ini file.*

Another technician was equally adamant that if I so much as touched the Comm.drv that came with Windows, all hell would break loose. On one of my computers, I made the change, and everything was fine. On the other, all hell did break loose (none of my other communications software would work right). What gives?

A: The confusion could come from the fact that in *this* respect, Windows 3.1 is different from Windows For Workgroups (WFW) 3.11. The Comm.drv that came with Windows 3.1 *was* flawed and *did* have to be replaced in order to get a fax or high-speed modem working correctly. This is done by changing the line "Comm.drv=Comm.drv" in your System.ini file to "Comm.drv=Wfxcomm.drv". This setting is found under the [Boot] section in this file. And, as the first technician suggested, you must make sure WinFax has copied its driver (Wfxcomm.drv) into your C:\WINDOWS\SYSTEM directory.

On the other hand, the Comm.drv that comes with WFW is newer, better, and should *not* be replaced with Wfxcomm.drv. Unfortunately, this is most confusing because this newer WFW driver, while very different, still has the same name as the old Windows 3.1 Comm.drv! ●

Get straight answers to your technical questions. Ask *PC Novice*! Send your questions, along with a phone and/or fax number so we can call you if necessary, to: PC Novice Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for all software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

GLOSSARY

Of Terms

Batch File—A file ending in the .BAT extension that contains several operating system commands that are executed in sequence when the batch file is run.

Binary Language—The form that information travels in throughout the computer. This language is based on two bits, a 1 and a 0.

BIOS—Basic Input/Output System. A routine stored in ROM (read-only memory) that controls communication between the PC and its hardware.

Bit—Short for binary digit, this is the smallest unit of data a computer can handle. Each bit has a value of 0 or 1 that the computer interprets as "off" or "on," respectively.

Boot Sector—The portion of a disk containing instructions for "booting," or starting up, the computer.

Byte—Eight bits make up one byte. A byte is equivalent to one alphanumeric character. Storage capacities of items such as hard drives, RAM, and diskettes usually are measured in either kilobytes or megabytes.

Data Transfer Rate—The speed, usually measured in bits per second, at which information can be transmitted.

Device Driver—Software designed to control a particular hardware device, such as a monitor or printer. These drivers act as go-betweens for programs and devices, ensuring the devices understand the software's commands.

E-mail—Electronic Mail. Refers to messages that are sent via computers on a network or to the system used for sending such messages.

Executable File—Any file that DOS thinks is really a program and can be executed. When you run your word processor, you usually "execute" a file that has a file name extension of either .EXE or .COM.

FTP—File-Transfer Protocol. A standardized, text-based method of transferring files over telephone lines from one computer to another.

GB—Gigabyte. A unit of computer storage equaling approximately one billion bytes.

Hard Drive—A nonremovable, high-capacity storage medium inside the computer's case that stores programs and data.

Hyperlink—A connector that lets you jump to different documents on the World Wide Web as you select highlighted words.

Hypertext—A presentation of information in which text, sounds, images, and actions are linked together through complex associations that let users browse related topics regardless of the order in which the topics are presented. The World Wide Web is built upon this concept of independent, yet interrelated, documents and graphics. If the data is primarily text-based, the information is called hypertext instead of hypermedia. (To be known as hypermedia, the information must contain video, music, or animation.)

Internet—A noncommercial, self-governing network devoted mostly to communication and research with some 20 million users worldwide. The Internet is not an online service and has no central "hub." Rather, it is a collection of tens of thousands of networks, online services, and single-user computers.

Kbps—Kilobits Per Second. This measures the data transfer speed on network PCs. One unit is equal to 1,024 bits per second of information being transferred.

MB—Megabyte. The unit most often used to measure the storage capacity of a hard drive, a diskette, or RAM. One megabyte is equal to about one million bytes.

Microprocessor—Known as the "brain" of the computer, this chip contains all the central processing functions of a PC. This also is known as the central processing unit (CPU).

Motherboard—The printed circuit board that is the foundation of a PC's system. This board contains the computer's CPU (central processing unit), RAM (random-access memory) chips, and expansion slots that let you add more functions to your PC.

Operating System—Software that controls the computer's operation, such as input/output control or data management. MS-DOS, Windows 95, and OS/2 are operating systems used with IBM-compatible computers. Windows 3.x is an operating *environment* because it requires MS-DOS to run.

RAM—Random-Access Memory. The temporary memory storage area used to load program instructions and store files currently in use. Unless a file is permanently stored on a hard drive, diskette, or other storage medium, changes to information in RAM will be lost when the computer is turned off.

ROM—Read-Only Memory. Memory in a computer system that can be read but not modified.

TSR—Terminate-And-Stay-Resident Program. A program that runs unseen in the background until it is called to the screen by a "hotkey" combination. Utilities such as antivirus programs often are TSRs.

Usenet Newsgroups—These Internet discussion groups may be considered free-floating bulletin boards because once a message is tacked up, someone can go to the board to look at the message(s) posted at any time.

Virus—An executable file that replicates itself and attaches to other executable programs in an unsolicited manner.

WAIS—Wide Area Information Servers. An Internet, multimedia, search-and-retrieval tool offering more than 500 databases. WAIS lets you look through the full text of documents rather than just their indices as with Gopher.

FAX FEEDBACK

HELP US HELP YOU!!!

The "Find It Online" section of *PC Novice* showcases a sample of the unlimited amount of online sites available. In order to direct you to the places you would like help finding online, we need to know what your interests are.

We also need your input for our new Action Editor column. Let us know of any problems you're having with manufacturers or products you just can' t find.

Please take a few moments to share your ideas and help us present you with the best information possible.

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If you do not have access to a fax machine or would prefer to mail your response, please address your comments to:

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Topic of the month . . . "Find It Online"

Here's your chance to tell us what you want to find online.

1. Which of the following online computer services are you currently a member of? (Please "X" all that apply.)
   - ☐ Commercial online service (AOL, Prodigy, etc.)
   - ☐ Internet
   - ☐ BBSes
   - ☐ Other (please list): ________________
   - ☐ NONE

   If "NONE," do you plan to become a member of an online service or BBS in the next 12 months?
   - ☐ Yes
   - ☐ No

2. Have you ever read the "Find It Online" section of PC Novice?
   - ☐ Yes, I've read it and I find it useful.
   - ☐ Yes, I've read it and it doesn't interest me.
   - ☐ No, I haven't read it but plan to in the future.
   - ☐ No, I haven't read it and don't plan to.

3. The site descriptions in "Find It Online"
   - ☐ are just about right.
   - ☐ aren't descriptive enough.
   - ☐ give too much information.
   - ☐ other (please list): ________________

4. What topics would you like to see included in future sections of "Find It Online"? (Please "X" all that apply.)
   - ☐ Technical (computer-related topics)
   - ☐ Hobbies (sports/leisure/interest groups)
   - ☐ General interest (entertainment/travel)
   - ☐ Business related
   - ☐ Other (please list): ________________

5. On which type of sites would you like "Find It Online" to focus? (Please "X" all that apply.)
   - ☐ Internet sites
   - ☐ Sites found on America Online
   - ☐ Sites found on Prodigy
   - ☐ Sites found on CompuServe
   - ☐ Other (please list): ________________

6. What are some of your favorite online sites?
   1. ________________
   2. ________________
   3. ________________

We look forward to hearing from you. Thanks for your time!

Name and address:

STOP *This is optional but necessary to be included in the drawing.*

Name: ________________

Address: ________________

Phone: (______) ________________

800 Reader Service

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IFC=Front Cover **IBC=Inside Back Cover** **BC=Back Cover**

Letters To The Editor

Dear *PC Novice*:

Your article "What's Wrong With WordPerfect" (February 1996) contained an incorrect statement. *WordPerfect for Windows* DOES let you delete files from within the program. You don't have to leave the program, as stated in the article, and go to the Windows File Manager to delete a file. Just open the File menu, choose Open, and at the Open File dialog box, click File Options from the lower right portion of the box. You can rename, copy, move, or delete files from here.

Kathleen Rose/Connellsville, PA

Dear *PC Novice*:

Ms. Pittman of Warren, Mich., doesn't seem to know her version of *WordPerfect* very well. WordPerfect 6.0 uses Layout on the menu bar, but version 6.1 uses Format. Format is the term most commonly used by word processors to add or change the attributes on a document. WordPerfect just finally caught up with everyone else. Your staff should have found the answer to this before writing the article. The article made it sound as if this were a problem with the software, and it is not. It isn't even a bug!

Virginia Garner/Houston, TX

Judging from the number of letters we received, we obviously missed the boat with our "What's Wrong With WordPerfect" article. We intended to showcase problems that users have with the program, but we should have made a clear distinction between what is actually a fault in the program and what people perceive as a fault. Some of the problems people are having result from a lack of experience with WordPerfect. What this does point out, however, is that even a program as popular as WordPerfect could improve in the area of user-friendly, intuitive functionality. —Ed.

CORRECTIONS/CLARIFICATIONS

In "Making The Right Toolbar For The Job" (February 1996), the instructions given for how to change your toolbar in File Manager are for Windows For Workgroups 3.11 and not Windows 3.1. However, the directions for *Microsoft Word* and *Excel* are the same, regardless of the Windows version.

Contrary to a statement made in the "Adding A Program Group/Menu Folder" section of "Basic Training" (February 1996) under Windows 3.1, existing program groups can be renamed in Program Manager by clicking a program group to highlight the description, opening the File menu, and choosing Properties. The Program Group Properties dialog box will open, and you just type in the new name of the program group and click OK.

Letters to the Editor should be sent to: *PC Novice* / P.O. Box 85380, Lincoln, NE 68501-5380. Letters may be edited for clarity or space.

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PC Novice (ISSN 1052-1186) is published monthly for $24 per year by Peed Corporation, 120 West Harvest Drive, P.O. Box 85380, Lincoln, NE 68501. Subscriber Services: 800-424-7900. Second-class postage paid at Lincoln, NE. POSTMASTER: Send address changes to PC Novice, P.O. Box 85380, Lincoln, NE 68501.

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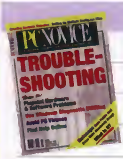

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